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DEFINITION OF HEAVY INDUSTRIES
AND GUIDELINES FOR ACCEPTABLE
TYPES OF MANUFACTURING USES
IN DELAWARE'S COASTAL ZONE

27 to

THE STATE OF DELAWARE

February, 1973

by

U. S. DEPARTMENT OF COMMERCE NOAA
COASTAL SERVICES CENTER
2234 SOUTH HOBSON AVENUE
CHARLESTON, SC 29405-2413

John M. Griffin *et al.*
Dorothy H. Douglass
Fred K. Goodman

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by

BATTELLE
Columbus Laboratories
505 King Avenue
Columbus, Ohio 43201

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Delaware State Planning Office

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CHAPTER 1. INTRODUCTION

In 1971, the State of Delaware passed the Coastal Zone Act designed to establish state procedures and policies with regard to management and protection of Delaware's Coastal Zone.* The Act, as written, is a broad, comprehensive approach to economic and environmental planning. An integral part of the implementation of the Coastal Zone Act was the establishment of the Delaware Coastal Zone Planning and Management Program. One of five work elements of this program is the definition of heavy industries and the type of acceptable industries that should be allowed to locate in the Coastal Zone of Delaware.

The purpose of this Battelle-Columbus study is to provide data and documentation that will be useful in formulating the definition of heavy industries. This report also includes recommendations as to the most acceptable types of industries for the Coastal Zone. The research program employed available data, somewhat limited in scope and detail, and statistical procedures to generate definitions of heavy industries and acceptable industries. The problems associated with generalizing from a limited data set were recognized. However, it was felt that objective analyses could be achieved only by relying upon hard data rather than descriptive evaluations. The research conducted by Battelle-Columbus should not be considered as an end in itself. Rather, the definitions and guidelines provided in this report should be used to evaluate applicant industries as they express desires to locate in the Coastal Zone area.

There are numerous ways of defining heavy industry. The Coastal Zone Act simply defines heavy industries as those that are incompatible with the protection of the natural environment. Thus, not all industries are excluded from the Coastal Zone area. According to the Coastal Zone Act, "Heavy industry use means a use characteristically involving more than 20 acres and characteristically employing some, but not necessarily all, of the following equipment: smoke stacks, tanks, distillation or reaction columns, chemical processing equipment, scrubbing towers, pickling equipment, and waste treatment lagoons." The Act also recognizes that many industries employing this type of facility can be nonpolluters if appropriate abatement equipment is installed and operated properly. However, the possibility exists that malfunctions in equipment could cause these industries to generate environmental impacts not tolerable in the Coastal Zone area. (The Act is written in such a manner that this possibility is avoided.) Therefore, industries are evaluated in terms of their potential or historical pollution and not on the pollution that is generated after the installment of pollution-abatement equipment.

In response to the basic goals given in the Coastal Zone Act, Battelle-Columbus undertook a seven-task research project to help identify and define heavy industries and to recommend industries suitable for development in the Coastal Zone. The first task selected the industries likely to locate in the Coastal Zone. If an industry were more likely to locate outside the Coastal Zone in Delaware, it was excluded from the list of possible industries. The first task evaluated all

*Section 1. Title 7, Delaware Code, Chapter 70.

manufacturing industries at the four-digit Standard Industrial Classification (SIC) level to determine which ones are most possible for the Coastal Zone.

Task 2 was to identify those industries likely to cause environmental degradation in the Coastal Zone. As initially envisioned, this task would have taken a set of environmental standards and compared them to the pollution emissions from the various industries.* However, the Coastal Zone Act requires that industries be evaluated not on their abated pollution, but rather on their potential pollution. Because of this fact, it is not possible to use environmental standards since these standards imply that abatement has taken place. Additionally, neither comprehensive nor Coastal Zone-specific secondary air and water standards are well established. Therefore, an alternative approach was adopted. This approach used unabated pollution levels for various industries to analyze and identify those industries that are significantly higher polluters than the majority of the industries who emit the same pollutant. Approximately, 40 pollution parameters were collected for industries included in this study. Of these 40, 10 were selected as indicators of potential industrial pollution. Industries with significantly higher than average pollution levels should not be allowed in the Coastal Zone. On the other hand, industries with normal or low pollution levels could be considered as potential industrial candidates. Implementation of a permit system suggested by the Act using criteria established by this and related studies will govern whether they may locate in the area.

Task 3 was the identification of unacceptable processes and products associated with the heavy industries identified in Task 2. This task was necessary to provide background information on why an industry should be considered a heavy polluter and also provide a rationale for excluding industries that also use unacceptable processes.

Tasks 4, 5, 6, and 7 provide data on other aspects of industries. For those industries that were not eliminated because of pollution levels, the land-labor ratios, multiplier effects, energy and water usage, and public service demands were evaluated. An industry may be deemed undesirable for the Coastal Zone because of the heavy demand it places on land or the demand on public facilities, or the possibility that it will attract heavy industry, as defined in Task 2.

Final decisions on which industries are allowed to locate in the Coastal Zone should be the responsibilities of decision makers within the State. The information provided by Battelle-Columbus in this report is intended to serve as guidelines so that such decisions can be made with some degree of objectivity and with the most up-to-date data available to them.

The format of this report closely follows the work outline proposed by Battelle-Columbus in its proposal to the State of Delaware. Following this introductory chapter, six chapters contain descriptions and results of the analyses to

*Proposed Research Program on Environmental Effects of Development in Delaware's Coastal Zone, Battelle-Columbus Laboratories, June 8, 1972.

define heavy industries. The last chapter contains a summary overview and a definition of heavy industries.

Final decisions on heavy industries must be made by decision makers in the State of Delaware. The data in this report provide a basis for such decisions. The use of this data in conjunction with the evaluation procedures to be suggested by Battelle-Columbus in Work Element 2 should lead to an adequate and objective evaluation of impacts in the Coastal Zone area.

CHAPTER 2. POSSIBLE INDUSTRIES FOR DELAWARE'S COASTAL ZONE

Although the tone of the Coastal Zone Act is definitely intended to preserve the physical environment and overall quality of life in the Zone, it is also recognized that part of the quality of life is economic viability. In order to promote economic prosperity as well as environmental preservation, allowable economic activities must be screened carefully. The first step in this process is to identify those industries with a definite reason and need for locating in the Coastal Zone.

The Coastal Zone of Delaware has definite boundaries as defined by the Act, but the area is also part of a larger socioeconomic region defined, not by political boundaries, but by functional interactions. For example, Dover is not physically part of the Coastal Zone, but it certainly dictates the economic viability of the Coastal Zone areas in Kent County. Therefore, it is not absolutely necessary for a plant to locate in the Coastal Zone in order to provide jobs and income to residents of the Zone. Thus, a plant considering a location in Kent County can benefit the entire county by locating in Dover. If there is no economic need for locating in the Zone, equal economic benefits for Zone residents can be realized by the plant being located outside the Zone.

On the other hand, some industries may need, require, or be ideally suited to the Coastal Zone. If locations in the Zone cannot be obtained, such industries may not locate in Delaware at all. In this case, industry should be evaluated for its compatibility with the purposes of the Coastal Zone Act. If an industry does not require a Coastal Zone location, it should be encouraged to locate in another part of Delaware.

The industrial potential of the Coastal Zone and of its subregions was identified using a series of screening techniques that evaluate industries on the degree of compatibility between industrial operating characteristics and subregional resources. The screening technique requires that a set of industrial operating characteristics be identified. Each industrial characteristic is matched by a variable that describes how well the subregion fulfills the requirements of the industry. Each variable is partitioned into subgroups defined by the range of data for the variable. An attempt was made to partition each variable into equal-sized subgroups of data. Each variable is subjectively given a maximum value and the subgroups within the variable are given a proportion of the maximum score. For example, rail-transport orientation might be the chosen variable and given a maximum score of five. Subgroups of this variable are high-rail orientation, average-rail orientation, and low-rail orientation. In a state or subregion that has good rail access, high orientation might be given a five; low-orientation a one. Conversely, in a subregion with poor rail access, industries with low-rail orientation would receive a five, and a high-rail orientation would be given a one. By weighting the subgroups of a variable in such a manner, the regional characteristics and industry requirements can be compared. To arrive at a final score for each screening, the scores received by an industry for each variable would be added together and rank ordered. The potential industries for development in an area would have the highest total

scores. Four screenings were carried out. The first was designed to sort out industries that are heavily water-oriented both in terms of water shipment and water use. The water-related variables used for the screening for the entire Coastal Zone were suggested by the Delaware Planning Office. These variables are listed below:

- (1) Forward linkage to water-transportation industries. *
- (2) Backward linkage to water-transportation industries. *
- (3) Water intake per employee per year. ** (Industries in which over 10,000 gallons of water are used per employee per year received a high score on this variable.)
- (4) Water used per year per employee for** cooling and condensing. (Industries which used over 20,000 gallons of water per employee per year for these purposes received the highest score.)
- (5) Water used per employee per year for** boiler feed, sanitary service, and other uses. (As for the other two water variables, the higher the quantity used, the higher the score the industry received on this variable.)

The industries receiving high scores on this screening have a strong water orientation and have reason to locate in Delaware's Coastal Zone. It should be pointed out that there is no water-use data available for the two-digit SIC categories of 23 (Apparel and Other Finished Products made from Fabrics and Other Similar Materials), 25 (Furniture and Fixtures), and 27 (Printing, Publishing, and Allied Industries).

Three other screenings were carried out on a subregional basis. The three separate subregions identified within the Coastal Zone are: (1) the northern-industrial subregion, extending from the Pennsylvania border to the Chesapeake and Delaware Canal; (2) the central, marshland subregion from the Chesapeake and Delaware Canal to Lewes; and (3) the recreation-oriented area south of Lewes. Each of these subregions has unique characteristics and will attract different types of industries.

The possible industries for development in a subregion were rank-ordered by their final total scores. The following sections describe the variables used for each of the three Delaware subregion screenings.

*Both of these variables are from 1963 input-output tables. The forward linkage refers to how much input an industry puts into the water-transportation industry. The backward linkage refers to how much an industry receives from the water-transportation industry. The higher the linkage figure, the higher the score the industry received.

**Water Use in Manufacturing, 1967, Census of Manufacturing, U. S. Department of Commerce, Bureau of the Census, April, 1971, Table 2.

Northern Subregion. The industrial characteristics used in the screening for the northern-industrial subregion of the Coastal Zone are listed below:

- (1) Water intake per employee per year
 - low use = high score
- (2) Percent of total shipments by rail
 - high percent = high score
- (3) Percent of total shipments by truck (highway)
 - high percent = high score
- (4) Percent of total shipments by water
 - high percent = high score
- (5) Percent of employees in industry completing 12 years or more of school
 - high percent = high score
- (6) Average number of employees per establishment
 - large number = high score.

Central Subregion. The criteria used for the screening for the middle, marshlands, and wildlife subregion follow:

- (1) Water intake per employee per year
 - middle range use = high score
- (2) Percent of total shipments by rail
 - low percent = high score
- (3) Percent of total shipments by truck (highway)
 - middle range percent = high score
- (4) Average number of employees per establishment
 - small number = high score
- (5) Percent laborers in industry
 - high percent = high score
- (6) Percent of total establishments located in urban areas
 - low percent = high score.

Southern Subregion. The recreational, southern subregion's screening utilized the following industry characteristics:

- (1) Water intake per employee per year
 - middle range use = high score
- (2) Percent of total shipments by rail*
 - high percent = high score
- (3) Percent of total shipments by truck (highway)
 - low percent = high score
- (4) Average hourly earnings of production workers
 - low earnings = high score
- (5) Average number of employees per establishment
 - small number = high score
- (6) Percent laborers in the industry
 - high percent = high score.

The northern subregion of the Coastal Zone is the heavy, industrialized portion of the Zone. Typical industries located in the area, at present, are oil refineries and storage facilities, chemical plants, and metal fabrication. A plentiful labor supply exists because of the concentrated population in Wilmington and the proximity to Philadelphia. The subregion has good access to all modes of transportation, especially, water and rail. Because the area is urbanized, it also has good access to a highly skilled labor force. Because of these characteristics, the variables listed earlier were selected for use in identifying feasible industries.

In the central subregion of the Coastal Zone, the heavy-industrialized environment gives way to an industrial climate characterized by smaller, non-durable manufacturing. Rail and highway transport are not as available as they are in the northern parts of the Zone. The more dispersed and smaller population means that the labor-force available is small. Also, the more rural nature of the population typically means the skill levels of the population are lower. Rural areas are also more attractive to low-wage paying industries since many workers are earning secondary incomes from farming. For these reasons, the variables listed above were selected.

The southern subregion is oriented toward resort and recreational activities but also has a high concentration of poultry farming. As highway access is relatively poor, industries which tend to use rail transportation more than trucking are desirable. Low wages, low skill levels, and small-sized establishments are

*Rail service is scheduled to be discontinued in this subregion. This screening assumes that this service could be reinstated if an industry needed it.

characteristics that new industries are likely to have. This subregion is not expected to industrialize with traditional manufacturing industries. Rather, it is expected that the existing recreation and resort economy will persist. Those industries that locate in this subregion most likely will be small, light-manufacturing activities. The variables selected to identify possible industries to locate in this subregion reflect these expectations.

The results of each of these screenings were ranked in order to indicate the relative likelihood of the industries locating in a particular subregion. The industries falling within the top 40 percent of the range of scores on the three subregional screenings were examined to see if these industries were also water-oriented industries. These water-oriented industries were defined in the first screening. Table 2-1 shows the industries which show the greatest potential for locating in the three subregions of the Coastal Zone. All of these industries are water-oriented. These industries have been rank-ordered according to the scores received on the subregional screenings. Appendix A contains the four complete screening lists which were used to compile Table 2-1.

TABLE 2-1. POSSIBLE INDUSTRIES FOR THE SUBREGIONS
OF THE DELAWARE COASTAL ZONE

SIC Code	Industry Name
<u>Northern Subregion</u>	
3731	Shipbuilding and repairing
3722	Aircraft engines and parts
3621	Motors and generators
<u>Central Subregion</u>	
2036	Fresh or frozen fish
2421	Sawmills and planing mills
2429	Special product sawmills
2426	Hardwood dimension mills
2015	Poultry processing
3316	Cold-rolled-steel sheet and bars
2095	Roasted coffee
2872	Fertilizers mixing
3362	Brass, bronze, and copper casting
3361	Aluminum casting
2035	Pickled fruits and vegetables
2033	Canned fruits, vegetables, and jams
2861	Gum and wood chemicals
2021	Creamery butter
2023	Condensed milk
2024	Ice cream
2026	Fluid milk
3255	Clay refractories
3275	Gypsum products
3281	Cut stone
3357	Nonferrous wire drawing
2094	Animal fats, oils
2831	Biological product
3299	Nonmetallic products, not elsewhere classified
2034	Dried fruits
2037	Frozen fruits and juices
2041	Flour and grain products
3296	Mineral wool
2031	Canned fish
3315	Steel-wire drawing and nails
3341	Secondary nonferrous metal
3399	Primary metal products, not elsewhere classified
3391	Iron and steel forgings
2231	Broad-woven wool fabrics
2086	Bottled and canned soft drinks
2013	Sausages

TABLE 2-1. (Continued)

SIC Code	Industry Name
<u>Southern Subregion</u>	
3341	Secondary nonferrous metal
2041	Flour and grain products
2036	Fresh or frozen fish
2052	Cookies and crackers
2095	Roasted coffee
3339	Primary nonferrous products, not elsewhere classified
2035	Pickled fruits and vegetables
3317	Steel pipe and tubes
2026	Fluid milk
2024	Ice cream
2045	Prepared flour
3361	Aluminum castings
3362	Brass, bronze, and copper castings

CHAPTER 3. INDUSTRIES WHICH COULD CAUSE ENVIRONMENTAL DEGRADATION

As pointed out in the Introduction, this task initially would have taken a set of environmental standards and compared them to the pollution emissions from the various industries. Instead, industries were analyzed according to the unabated pollution generally produced by these industries. Those industries that are significantly higher polluters than the majority of the industries were identified. Ten pollution parameters were chosen to indicate industries with a high pollution potential. * The parameters used were:

(1) Biochemical Oxygen Demand. Biochemical oxygen demand (BOD) is a surrogate indicator of the effect of a combination of substances and conditions on water quality. Specifically, BOD is a measure of the amount of dissolved oxygen that will be depleted from water during the natural biological assimilation of organic pollutants.

(2) Dissolved Solids. The concentration of total dissolved solids is the aggregate of carbonates, bicarbonates, chlorides, sulfates, phosphates, and nitrates of calcium, magnesium, sodium, potassium, and other substances. The nature and magnitude of changes in water quality depends, to a large extent, upon the total concentration of the above salts, commonly referred to as total dissolved solids.

(3) Inorganic Nitrogen. Nitrogen is one of the basic elemental nutrients needed to sustain aquatic life. Trace quantities are essential to support aquatic ecosystems. However, excessive quantities of nitrogen promote overenrichment and are undesirable.

(4) Phosphorus. Phosphorus is similar to nitrogen in that small quantities in water are necessary but large quantities are detrimental to aquatic life.

(5) Suspended Solids. Suspended solids from various types of waste discharge cause turbidity. Turbidity is measured by the extent to which light passing through water is reduced by scattering induced by suspended materials. Turbidity is undesirable for a number of reasons. For example, it minimizes photosynthesis by interfering with the penetration of light.

(6) Hydrocarbons. Hydrocarbons in air result from the incomplete combustion of petroleum products, and contribute to smog formation.

(7) Nitrogen Oxides. Oxides of nitrogen, together with hydrocarbons, participate in photochemical reactions leading to the formation of photochemical smog. Nitric oxide forms during high-temperature combustion; it then oxidizes to nitrogen dioxide, which leads to the smog formation.

*Forty pollution parameters were collected for industries included in this study. However, Battelle scientists involved with air and water pollution technology felt that the ten variables discussed above constitute adequate description of pollution characteristics.

(8) Particulates. Suspended particulate matter, often referred to as particulates, is the most prevalent atmospheric pollutant and detracts from the usual quality of air.

(9) Sulfur Oxides. Sulfur dioxide is generally the only sulfur oxide considered. At very high concentrations, it is readily detectable by taste or smell.

(10) Oil and Grease. The discharge of oil and grease into surface waters can create serious environmental problems by forming barriers to oxygen entering the water, thereby cutting oxygen supplies of fish and wildlife.

If an industry had a pollution level greater than two standard deviations above the mean for the BOD, suspended solids, particulates, and sulfur oxides parameters, it received a score of four on the parameter being examined. A score of three was given when the amount generated by an industry was between one and two standard deviations above the mean. Two was given for an amount between the mean value and one standard deviation above the mean. All remaining and lower amounts rated a score of one. Because of the small number of industries which have values on the remaining six types of pollution, scores were given to the industries according to the data distribution. The scores each industry received on each pollution variable are shown in Appendix B. Table 3-1 lists the industries with a high-pollution potential based on the above described pollution parameters. These industries have been sorted so that the industries with the highest pollution potential comes first on the list. The actual values of pollution generated by industries for which data exist are shown in Table 3-2.

TABLE 3-1. INDUSTRIES WITH A HIGH POLLUTION POTENTIAL

SIC	Industry	SIC	Industry
2819	Inorganic chemicals, not elsewhere classified	2411	Logging camps and logging contractors
2044	Rice milling	2421	Sawmills and planing mills
2911	Petroleum refining	2429	Special-product sawmills, not elsewhere classified
2022	Cheese, natural and processed	2815	Dyes and cyclic crudes
2892	Explosives	2861	Gum and wood chemicals
3312	Blast furnaces and steel mills	2895	Carbon black
2879	Agricultural pesticides	3111	Leather tanning
2011	Meat-packing plants	3271	Concrete block and brick ^(a)
2085	Distilled, rectified, and blended liquors	3272	Concrete products, except block and brick ^(a)
2611	Pulp mills	3295	Minerals and earths, ground or otherwise treated ^(a)
2812	Alkalies and chlorine	3331	Primary copper ^(a)
2813	Industrial gases	3332	Primary lead ^(a)
2013	Sausage and prepared meats	3333	Primary zinc ^(a)
2015	Poultry processing		
2026	Fluid milk		

(a) These industries had extraordinarily high pollution in one category only.

TABLE 3-2. INDUSTRY VALUES FOR THE POLLUTION PARAMETERS
USED TO DERIVE TABLE 3-1

Sorted Values of BOD, lb/emp			
Rice milling	685,000	Pulp mills	75,400
Prefabricated wooden buildings	40,800	Cooperage	39,400
Wood preserving	38,400	Veneer and plywood	31,220
Millwork	30,650	Logging camps and logging contractors	28,220
Sawmills and planing mills	26,200	Malt	24,300
Wooden boxes	23,200	Wood products, nec. *	23,130
Bottled soft drinks	23,100	Wirebound boxes and crates	20,800
Hardwood dimension and flooring mills	18,080	Beet sugar	14,400
Veneer plywood containers	13,100	Building paper and building paperboard	12,710
Petroleum refining	12,350	Soap and detergents	10,500
Gum and wood chemicals	9,050	Wet corn milling	7,570
Meat packing	7,320	Organic chemicals, nec. *	7,120
Paper products	6,980	Blast furnaces and steel mills	6,600
Paperboard mills	6,550	Dyes cyclic crudes	5,060
Paper coating and glazing	4,850	Canned and preserved fruits, vegetables	4,190
Alkalies and chlorine	3,980	Creamery butter	3,810
Animal and marine fats and oils	3,790	Cheese, natural and processed	3,040
Carpets and rugs	3,030	Plastic materials and synthetic resins	2,850
Leather tanning	2,665	Sausage and prepared meats	2,160
Wool scouring and worsted	1,950	Cellulosic fibers	1,938
Paper mills	1,725	Inorganic chemicals, nec. *	1,672
Synthetic fibers	1,415	Fluid milk	1,082
Poultry processing	940	Inorganic pigments	872
Grain and flour products	731	Malt liquor	650
Explosives	612	Broad woven wool fabrics	469
Ice cream	284	Millinery	192
Truck and bus bodies	180	Man-made finishers	133
Condensed and evaporated milk	131	Asbestos products	116
Distilled and blended liquors	86	Broad woven man made	81
Motor vehicles and car bodies	50	Metal stamping	49
Gray iron foundries	19	Motor vehicle parts	18
Cut stone and stone products	14	Synthetic rubber	8
Paving mixtures and blocks	<1	Asphalt felts	<1
Mean = 19,651		Standard Deviation = 83,649	
Sorted Values of Dissolved Solids, lb/emp			
Agricultural pesticides	1,153,000	Alkalies and chlorine	600,000
Cheese, natural and processed	336,000	Inorganic chemicals, nec. *	105,500
Explosives	26,200	Leather tanning	14,800
Inorganic pigments	10,650	Dyes cyclic crudes	6,230
Petroleum refining	1,332	Fluid milk	1,183
Beet sugar	154	Cotton finishers	36
Pulp mills	1		
Mean = 173,468		Standard Deviation = 330,885	
Sorted Values of Nitrogen, lb/emp			
Cheese, natural and processed	8,040,000	Rice milling	19,280
Petroleum refining	1,775	Explosives	1,383
Poultry processing	188	Malt liquor	43
Fluid milk	20	Beet sugar	>1
Mean = 1,007,836		Standard Deviation = 2,657,915	
Sorted Values of Phosphorus, lb/emp			
Rice milling	19,280	Cheese, natural and processed	2,684
Agricultural pesticides	1,732	Blast furnaces and steel mills	614
Poultry processing	298	Flat glass	117
Rolling drawing extruding aluminum	105	Glass products (purchased glass)	70
Truck and bus bodies	11	Malt liquor	4
Metal stamping	3	Motor vehicles and car bodies	3
Fluid milk	1	Motor vehicle parts	1
Mean = 1,780		Standard Deviation = 4,913	

TABLE 3-2. (Continued)

Sorted Values of Suspended Solids, lb/emp			
Rice milling	392,000	Distilled and blended liquors	141,200
Cement - hydraulic	89,100	Pulp mills	81,000
Building paper and building paperboard	73,700	Paper coating and glazing	58,400
Paper products	38,400	Alkalies and chlorine	37,500
Malt	37,000	Inorganic pigments	26,950
Inorganic chemicals, nec.*	25,100	Veneer and plywood	23,000
Primary aluminum	22,420	Logging camps and logging contractors	20,800
Blast furnaces and steel mills	19,280	Sawmills and planing mills	19,250
Wood products, nec.*	17,020	Petroleum refining	16,000
Beet sugar	14,400	Hardwood dimension and flooring mills	13,300
Paperboard mills	12,680	Leather tanning	10,590
Carpets and rugs	10,050	Veneer plywood containers	9,640
Wet corn milling	8,620	Man-made finishers	7,400
Explosives	6,070	Meat packing	5,570
Millinery	4,730	Paper mills	4,040
Creamery butter	3,810	Bottled soft drinks	3,080
Cheese, natural and processed	3,040	Wool scouring and worsted	2,925
Wood preserving	2,828	Millwork	2,260
Sausage and prepared meats	2,160	Concrete block, brick, and other products	1,280
Fluid milk	1,051	Gum and wood chemicals	1,001
Malt liquor	986	Rolling, drawing, extruding aluminum	938
Grain and flour products	900	Plastic materials and synthetic resins	786
Canned and preserved fruits, vegetables	605	Asbestos products	598
Ready mixed concrete, lime, and gypsum	565	Organic chemicals, nec.*	512
Poultry processing	501	Truck and bus bodies	461
Flat glass	428	Ingot casting aluminum	410
Ice cream	284	Cellulosic fibers	234
Dyes cyclic crudes	195	Synthetic fibers	172
Broad woven man made	147	Condensed and evaporated milk	131
Motor vehicles and car bodies	130	Broad woven wool fabrics	104
Metal stamping	74	Motor vehicle parts	48
Roasted coffee	15	Glass products (purchased glass)	13
Synthetic rubber	<1	Machinery except electrical	<1
Pressed and blown glass and glassware	<1		
Mean = 19,072		Standard Deviation = 52,131	
Sorted Values of Hydrocarbons, lb/emp			
Carbon black	1,895,000	Inorganic chemicals, nec.*	358,500
Paving mixtures and blocks	240,500	Synthetic rubber	128,200
Gum and wood chemicals	31,300	Distilled and blended liquors	10,400
Petroleum refining	6,200	Asphalt felts	6,160
Cellulosic fibers	821	Roasted coffee	665
Synthetic fibers	600	Paints, varnishes, enamels	149
Meat packing	81	Sausage and prepared meats	49
Mean = 191,330		Standard Deviation = 484,214	
Sorted Values of Nitrogen Oxides, lb/emp			
Primary zinc	953,000	Inorganic chemicals, nec.*	232,000
Grain and flour products	32,500	Organic chemicals, nec.*	4,940
Brick and structural tile	2,145	Petroleum refining	1,370
Clay refractories	743	Steel foundries	10
Mean = 153,338		Standard Deviation = 311,251	
Sorted Values of Particulate, lb/emp			
Minerals and earths ground	1,080,000	Concrete block, brick, and other products	769,000
Inorganic chemicals, nec.*	464,000	Ready mixed concrete, lime, and gypsum	340,000
Electrometallurgical products	280,000	Blast furnaces and steel mills	230,000
Carbon black	189,500	Cement - hydraulic	133,500
Gum and wood chemicals	125,200	Brick and structural tile	112,200
Fertilizers	111,400	Fertilizer mixing	105,000
Paving mixtures and blocks	93,700	Primary lead	68,300
Primary copper	57,500	Paints, varnishes, enamels	46,600

TABLE 3-2. (Continued)

Sorted Values of Particulate, lb/emp (Continued)			
Primary aluminum	42,000	Nonclay prefactories	39,100
Clay refractories	38,800	Prefabricated wooden buildings	38,700
Miscellaneous chemicals	37,400	Wood preserving	36,400
Secondary nonferrous metals	30,100	Veneer and plywood	29,600
Millwork	29,000	Logging camps and logging contractors	26,750
Glass products (purchased glass)	25,000	Sawmills and planing mills	24,830
Wooden boxes	22,000	Wood products, nec.*	21,890
Soap and detergents	20,720	Alkalies and chlorine	20,570
Wirebound boxes and crates	19,700	Hardwood dimension and flooring mills	17,100
Wet corn milling	14,250	Machinery except electrical	13,990
Veneer plywood containers	12,400	Agricultural pesticides	12,050
Mineral wool	11,980	Explosives	8,250
Asphalt felts	8,225	Primary zinc	5,550
Gray iron foundries	3,266	Paper mills	2,503
Brass, bronze, copper, casting	1,880	Petroleum refining	1,570
Ingot casting aluminum	1,102	Distilled and blended liquors	1,018
Steel foundries	904	Paperboard mills	863
Malt liquor	612	Meat packing	350
Printing ink	274	Pressed and blown glass and glassware	264
Pulp mills	230	Sausage and prepared meats	212
Mean = 86,201		Standard Deviation = 186,380	
Sorted Values of Sulfur Oxides, lb/emp			
Primary lead	980,000	Primary copper	638,000
Inorganic chemicals, nec.*	83,700	Secondary nonferrous metals	57,300
Asphalt felts	16,550	Petroleum refining	11,870
Explosives	10,550	Agricultural pesticides	5,610
Fertilizers	4,540	Fertilizer mixing	4,310
Plastic materials and synthetic resins	2,202	Medicinal chemicals	924
Pharmaceutical preparations	800	Sanitary food containers	712
Corrugated fiber boxes	700	Folding paperboard boxes	567
Fiber cans, tubes, drums	564	Machinery except electrical	520
Electrical machinery, equipment and supplies	462	Prefabricated wooden buildings and structures	417
Cooperage	402	Wood preserving	392
Biological products	376	Veneer and plywood	319
Millwork	313	Heating and plumbing fixtures	312
Fabricated structural steel	302	Other metal fabricated products	302
Logging camps and logging contractors	288	Setup paperboard boxes	281
Sawmills and planing mills	260	Mineral wool	239
Wooden boxes	237	Wood products, nec.*	236
Motor vehicles and car bodies	221	Truck and bus bodies	221
Wirebound boxes and crates	212	Veneer plywood containers	133
Motor vehicle parts	82	Pulp mills	21
Mean = 45,636		Standard Deviation = 179,932	
Sorted Values of Oil and Grease, lb/emp			
Explosives	6,130	Blast furnaces and steel mills	4,600
Meat packing	3,650	Petroleum refining	2,282
Wool scouring and worsted	1,595	Sausage and prepared meats	936
Organic chemicals, nec.*	658	Rolling, drawing, extruding aluminum	482
Leather tanning	424	Dyes cyclic crudes	311
Ingot casting aluminum	93	Truck and bus bodies	54
Flat glass	42	Poultry processing	40
Motor vehicles and car bodies	15	Metal stamping	15
Motor vehicle parts	5		
Mean = 1,255		Standard Deviation = 1,796	

*Nec means not elsewhere classified.

Unacceptable Processes and Products

For each of the industries identified as having a high pollution potential (listed in Table 3-1), the pollutants which they produce in large quantities and the processes which are probably causing the problems are discussed below.

2819 Industrial Inorganic Chemicals,
Not Elsewhere Classified

Important products of this industry include inorganic salts of sodium, potassium, aluminum, calcium, chromium, magnesium, mercury, nickel, silver, tin; inorganic compounds such as alums, calcium carbide, hydrogen peroxide, phosphates, sodium silicate, ammonia compounds, and anhydrous ammonia; rare-earth metal salts and elemental bromine, fluorine, iodine, phosphorus, and alkali metals (sodium, potassium, lithium, etc.). Obviously, an industry such as this, which has many companies producing many different types of products, would produce a variety of pollutants. The types of pollutants this industry produces in quantity are: particulates, hydrocarbons, nitrogen oxide, sulfur oxides in the atmosphere, and dissolved and suspended solids in water.

Hydrocarbons, particularly methane, are emitted when a company produces ammonia. Hydrochloric acid is another product produced by firms in this industry category. Hydrogen chloride emissions are produced when chlorine is added to an organic compound such as benzene, toluene, or vinyl chloride. Hydrofluoric acid, another product of this industry, production may cause fluorides and particulates to be emitted. The process used in the United States to produce this acid is the reaction of acid-grade fluorspar with sulfuric acid for 30 to 60 minutes in externally fired rotary kilns at a temperature of 400 F. The resulting gas is then cleaned, cooled, and absorbed in water and weak hydrofluoric acid to form a strong acid solution. Nitric acid is still another product which is classified in the 2819 industry group. The main source of atmosphere emissions from the manufacture of nitric acid is the tail gas from the absorption tower, which contains unabsorbed nitrogen oxides.

Another product in this industry group, phosphoric acid, is produced by two principal methods, the wet process and the thermal process. The wet process is usually employed when the acid is to be used for fertilizer production. In this process, finely ground phosphate rock is fed into a reactor with sulfuric acid to form phosphoric acid and gypsum. The gypsum is handled as a waste product since there is little market for it. In addition to the gypsum, emissions of gaseous fluorides, consisting mostly of silicon tetrafluoride and hydrogen fluoride, are the major problems from wet-process acid. In the thermal process, phosphate rock, siliceous flux, and coke are heated in an electric furnace to produce elemental phosphorus. The acid produced by this process is normally of high purity and is used in the manufacture of high-grade chemical and food products. The principal emission from thermal-process acid is P_2O_5 acid mist from the absorber tail gas.

Sulfuric acid in the United States is generally produced by the contact process. Contact plants may be classified according to the raw materials used: (1) elemental sulfur-burning plants, (2) sulfide ore and smelter gas plants, and (3) spent-acid and hydrogen sulfide burning plants. The major source of emissions from any of these contact plants is waste gas from the absorber exit stack. The gas discharged to the atmosphere contains predominately nitrogen and oxygen, but unreacted sulfur dioxide, unabsorbed sulfur trioxide, and sulfuric acid mist and spray are also present. Minor quantities of sulfur dioxide and sulfur trioxide may come from storage-tank vents, from tank-truck and tank-car vents during loading operations, from sulfuric acid concentrators, and from leaks in process equipment.

Because of the large number of chemicals included in this industry category and the diversity of their effect on water, it is very difficult to generalize about the amount of water pollution generated by this industry. To be entirely sure which process was causing water pollution near a plant, each waste stream would have to be examined.

2044 Rice Milling

Rice-milling establishments are primarily engaged in cleaning and polishing rice and in manufacturing rice flour or meal. The pollutants most likely to be generated by rice milling firms are water pollutants. The major emissions are in the form of BOD, nitrogen, phosphorus, and suspended acids. This industry, like other food industries, uses large amounts of water. The water used in the rice-milling industry is primarily required for washing.

Dust-collection systems are generally applied to most phases of milling operations. The efficiency of these systems can affect the final particulate emissions.

The type of processing (wet or dry), the amount of grain processed, the amount of cleaning, the degree of drying or heating, the amount of grinding, the temperature of the process, and the degree of control applied to the particulates generated affect emissions from grain-processing operations.

2911 Petroleum Refining

The petroleum refining industry includes establishments that produce gasoline, kerosene, distillate fuel oils, residual fuel oils, lubricants, and other products from crude petroleum and its fractionation products. The principal processes used are straight distillation of crude oil, redistillation of unfinished petroleum derivatives, and cracking.

The refining operation can be broken down into four major steps: separating, converting, treating, and blending; these processes are discussed further in the following paragraphs.

Separating is usually performed through the process of crude oil distillation which takes advantage of the different physical properties of the hydrocarbons which compose crude oil. This primary separation produces refinery gas, gasoline, kerosene, light fuel oil, diesel oil, gas oil, lube distillate, and heavy bottoms. These, in turn, are treated to remove impurities.

Converting is accomplished by three means. Catalytic cracking is the process whereby heavy molecules are cracked or split into molecules of a desired type. Catalytic reforming, by molecular rearrangement, produces gasoline of a higher quality and octane number. Polymerization is used to produce gasoline from the gaseous hydrocarbons formed during cracking operations.

Products from separation and conversion are treated for the removal of sulfur compounds and gum-forming materials.

Finally, refined stocks are blended with each other to meet product specifications.

The major pollutants emitted from refineries are sulfur oxides, nitrogen oxides, hydrocarbons, carbon monoxide, and malodorous materials. Other emissions of lesser importance include particulates, aldehydes, ammonia, and organic acids. Boilers, process heaters, and catalytic-cracking-unit regenerators are major sources of sulfur oxides, nitrogen oxides, and particulates. The catalytic-cracking-unit regenerators are also large sources of carbon monoxide, aldehydes, and ammonia. The many hydrocarbon sources include waste-water separators, blow-down systems, catalyst regenerators, pumps, valves, cooling towers, vacuum jets, compression engines, process heaters, and boilers.

2022 Cheese, Natural and Processed

Firms in this industry category manufacture all types of natural cheese (except cottage cheese), processed cheese, cheese foods, and cheese spreads. The major emissions coming from this industry type are dissolved solids, BOD, nitrogen, and phosphorus. All of these emissions are water pollutants. The amounts of these wastes depend a great deal upon the type of individual processing steps and water use and reuse in each plant.

2892 Explosives

Explosives fall into two major categories: high explosives and low explosives such as TNT and nitrocellulose, respectively.

Toluene, nitric acid, and sulfuric acid are the raw materials used in the preparation of TNT. A combination of nitric acid and fuming sulfuric acid is used as the nitrating agent. Spent acid is "recycled" and used again in the nitrating process. After nitration, undesirable by-products are removed by agitation with a solution of

sodium sulfite and sodium hydrogen sulfite. The waste wash is either discharged directly into a stream or is concentrated into a slurry and incinerated.

The raw materials used in the production of nitrocellulose are cellulose, nitric acid, and a dehydrating agent such as sulfuric acid, phosphoric acid, or magnesium nitrate. After the cellulose has been nitrated (by a process called the "mechanical dipper"), the reaction mixtures are centrifuged to remove most of the spent acid.

The major emissions from the manufacturing of explosives are nitrogen oxides. The nitration reactors for TNT production and the reactor pots and centrifuges for nitrocellulose represent the largest nitrogen oxide sources. Sulfuric acid regenerators are the major source of sulfur oxide emissions.

Other sources of emissions are the processes that produce the raw materials (nitric acid, sulfuric acid) for explosive production. Sulfur oxides and nitrogen oxides are examples of such emissions. The raw materials may or may not be manufactured at the explosives plant.

Other pollutants that may be generated when producing explosives are high levels of BOD and dissolved and suspended solids in water and nitrogen.

3312 Blast Furnaces, Steel Works, and Rolling Mills

This industry category includes a large variety of firms which produce a great many products. For example, hot metal, pig iron, and ferroalloys are produced from iron ore and iron and steel scrap; steel is made by converting pig iron, scrap iron, and scrap steel. Products such as plates, sheets, strips, rods, bars, and tubings are made by the hot rolling iron and steel.

The blast furnace is used to remove impurities from pig iron in the steel-making process. Slag and blast-furnace gases are by-products of this process. As blast-furnace gas leaves the top of the furnace, it contains large amounts of particulate matter; about 30 percent iron, 15 percent carbon, 10 percent silicon dioxide, and small amounts of aluminum oxide, manganese oxide, calcium oxide, and other materials. Carbon monoxide generated in the blast furnace is used for fuel in the process.

A further refinement of the pig iron is accomplished in open-hearths, basic oxygen furnaces, and electric furnaces. The fumes from open-hearth furnaces consist predominately of iron oxides. In the basic oxygen furnace, a considerable amount of particulate matter (largely in the form of oxides) is generated. Carbon monoxide is also emitted, but in small amounts. The electric arc furnace (used to produce steel alloys) emits carbon monoxide.

2879 Agricultural Pesticides and Other Agricultural Chemicals, Not Elsewhere Classified

Firms in this industrial classification are engaged primarily in the formulation and preparation of ready-to-use agricultural pest-control chemicals, including insecticides, fungicides, and herbicides from technical chemicals or concentrates. Also included in this category is the production of concentrates which require further processing before use as agricultural pesticides. This industry also includes establishments which produce minor or trace elements and soil conditioners. Basic or technical agricultural pest-control chemicals such as lead and calcium arsenates, copper sulfate, DDT, BHC, and 2, 4-D carbamates are not included.

The major emissions from this group as a whole are in the form of dissolved solids and phosphorus in water and some solid wastes.

Insecticides can be divided into three groups: (1) stomach poisons, (2) contact poisons, and (3) fumigants. Insecticides are usually a blend of several ingredients in order to achieve desirable characteristics.

Two methods are used to produce solid insecticides: (1) adding the toxicant in liquid state to a dust mixture (e. g. , finely divided porous clay) or (2) adding a solid toxicant to the dust mixture. The equipment employed consists of standard grinding and size-reduction machines. The most common means of producing liquid pesticides consists of introducing a solid toxicant into a liquid carrier.

Air pollutants generated by the insecticide industry are either dusts and/or organic-solvent vapors. The dust is extremely toxic, though noncorrosive. Organic-solvent vapors originate from nonvolatile solvents and as such, do not present a pollution problem.

2011 Meat Packing Plants

This industrial category includes plants which are engaged in the slaughtering of cattle, hogs, sheep, lambs, calves, horses, and other animals for meat. This meat would either be sold or used on the same premises in canning, curing, and in making sausage, lard, and other products. In this industry, the major pollutants are a high biochemical oxygen demand (BOD) resulting from large quantities of blood from the killing operation, suspended solids, and grease. The blood does have a commercial value and, therefore, should be recovered. Whole blood has a number of by-product uses such as fertilizer, livestock feed, and adhesives. Another major problem in the slaughterhouse is the disposal of the paunch manure. This should be handled in a dry fashion if at all possible, but is frequently flumed away and removed on screens. This operation, again, adds considerable BOD and suspended solids to the liquid waste from the plant. Grease accumulation is also a problem in this industry, especially when the meat is cooked, cured, or canned. The removal of free-floating grease is important to avoid clogging of sewer lines and fouling of biological treatment plants. The most common types of grease-recovery processes are gravity or air flotation separators.

2085 Distilled, Rectified, and Blended Liquors

Emissions from fermentation processes are nearly all gases and consist of carbon dioxide, hydrogen, oxygen, and water vapor. Emissions of particulates can occur in the handling of grain for beer and whiskey manufacturing. Gaseous hydrocarbons are also emitted from the drying of spent grains and yeast in beer and from the whiskey-aging warehouses.

Particulate emissions from grain handling and drying of spent grains in the manufacturing of beer and whiskey range from 3 to 5 pounds per ton. Hydrocarbon emission in the aging process of whiskey manufacturing is approximately 10 pounds per year per barrel of whiskey stored.

2611 Pulp Mills

The pulp mill industry is made up of establishments which produce pulp from wood or from other materials such as rags, linters, waste paper, and straw.

Wood pulping involves the production of cellulose from wood by dissolving the lignin that binds the cellulose fiber together. Wood chips are cooked under pressure in an aqueous solution (cooking liquor) of sodium sulfide and sodium hydroxide; this dissolves the lignin. The lignin and spent cooking liquor is drained and the pulp enters the initial stages of washing and bleaching. The spent cooking liquor is sprayed into a recovery furnace and later reused.

Particulate emissions occur primarily in the recovery furnace, lime kiln, and smelt-dissolving tank. Estimates of emissions range from 0.7 to 15 pounds per ton if treated and 45 to 151 pounds per ton if untreated.

Hydrogen sulfide, dimethyl disulfide, and methyl mercaptan are generated in the initial cooking stage. The odor from pulp mills is caused principally by the presence of a mixture of hydrogen sulfide and dimethyl disulfide. Sulfur dioxide is emitted during the recovery process, as is carbon monoxide.

Other types of chemical pulping are also quite common today. The ratio of bleached and unbleached kraft pulp to total pulp production is increasing steadily, chiefly because of the successful application of the kraft process to a wide variety of wood species. Chemical recovery is an integral part of the kraft process; therefore, the BOD discharged to the stream per ton of pulp produced is the lowest for any of the processes. Pollution parameters which must be taken into consideration in this process are suspended solids, biodegradable organics, color of the effluent, foam, and materials potentially toxic to aquatic life.

The first pulping process used predominately on the American continent, was sulfite pulping. This was because of the availability of spruce and balsam which are readily cooked by this process. Also, sulfite pulping used low-cost chemicals such as lime and sulfur in preparing the cooking liquor. These could be discarded

after use, and expensive recovery systems were, therefore, unnecessary. The fact that approximately half of the log is discarded in the mill effluent rather than being burned during a process of chemical recovery explains the high BOD per ton of sulfite pulp produced.

Midway between kraft and sulfite in pollutional characteristics are semi-chemical pulps. Because of the much lower degree of chemical treatment, the BOD per ton of product is less than that for sulfite pulp. However, most semi-chemical mills have no chemical recovery; so the BOD released to the stream is much higher than for kraft pulping.

The multiplicity of processes, products, and pollution problems emphasizes the fact that the pulp industry is not a single industry, but rather a large number of industries. Many mills may produce the same product, but few do it in the same way. And, few can apply identical procedures to solve their pollution problems.

2812 Alkalies and Chlorine

Chlorine and alkalies are produced concurrently by the electrolysis of brine in either the diaphragm or mercury cell. Emissions from these processes include chlorine gas, carbon dioxide, carbon monoxide, and hydrogen. Other emissions include mercury vapor from mercury cathode cells and chlorine from compressor seals, header seals, and the air blowing of depleted brine in mercury-cell plants. The industrial gases (SIC 2813) group produces similar types of emissions.

2013 Sausage and Other Prepared Meat Products

In the sausage and other prepared meat products industry, animal matter not suitable as food for humans or pets is the principal waste product. It is dealt with in the following way.

Rendering is a heat reduction process wherein fat-containing materials are reduced to tallow and proteinaceous materials. Dry rendering is the most widely used reduction process. An indirect heat supply breaks down the flesh and bone structure, allowing tallow to separate from solids and water. Rendered products are further refined to produce dry proteinaceous cracklings and clear moisture-free tallow. Many processes consist essentially of a series of grinders, steam-jacketed conveyor cookers, and pressers.

Animal blood is generally evaporated and thermally digested to produce a dry meal used as fertilizer. This dusty meal may be emitted in exit gases.

2015 Poultry Processing

The rendering and blood evaporation processes described above can also be applied to the poultry industry. In addition, poultry feathers must be reduced to some useable commodity. This is done by pressure cooking and drying the feathers to produce a high-protein meal used principally as a poultry feed supplement.

Malodors are the principal air contaminants emitted from inedibles-rendering equipment. Reduction-plant odors emanate from the handling and storage of raw materials, some of which are highly decayed before they reach the plants. Cooking and drying processes are considered the largest odor sources.

2026 Fluid Milk

Fluid milk establishments are primarily engaged in processing (pasteurizing, homogenizing, vitaminizing, bottling) and distributing fluid milk, cream, and related products. As in the rest of the food industry, the major emissions are in the form of water pollutants (especially BOD) and controlled product losses serve the double function of improved yield and efficiency and at the same time reduce potential waste pollution problems.

Because of the method of processing milk and the other products which are produced in this industry, there are, at times, surpluses of separated milk, buttermilk, or whey, as well as occasional batches of sour milk. Unfortunately, there is no simple, economical method to reclaim and utilize these materials as by-products. Therefore, the disposal of this material becomes a very serious problem. Indiscriminate dumping of this material into sewers should be avoided, and where possible, these extremely strong wastes should be treated separately or disposed of by hauling away.

2411 Logging Camps and Logging Contractors and 2421 Sawmills and Planing Mills

Although a small part of the wood waste produced from lumber mills and wood working industries can be processed into useful products, the bulk of this material is disposed of by incineration, open burning, or hauling to a dump. Landfill disposal is the most satisfactory pollution-control solution, however, incineration is the most economical.

Burning of wood waste is accompanied by dense clouds of smoke, fly ash, and disagreeable odors. These air contaminants are caused by incomplete combustion and are discharged in the form of particulate matter, aldehydes, hydrocarbons, and organic acids, as well as smoke and fly ash.

Woodworking machines produce large quantities of waste sawdust, chips, and shavings that must be removed from the equipment site. As one might expect,

the major emissions from this industry are dust and small wood shavings. Processes involved in creating these air pollutants are: drilling, carving, cutting, routing, turning, sawing, grinding, shredding, planing, or sanding wood. The same pollutants would be expected for SIC 2429.

2815 Cyclic Intermediates, Dyes, Organic Pigments (Lakes and Toners), and Cyclic (Coal Tar) Crudes

Firms in this industry category produce a large variety of chemicals. They primarily produce cyclic organic intermediates, dyes, color lakes and toners, and coal-tar crudes. Other important products include: (1) derivatives of benzene, toluene, naphthalene, anthracene, pyridine, carbazole, and other cyclic chemical products; (2) synthetic organic dyes; (3) synthetic organic pigments; and (4) cyclic (coal tar) crudes such as light oils and light-oil products, coal-tar acids, and products of medium- and heavy-oil such as creosote oil, naphthalene, anthracene, and their higher homologues, and tar. For the industry as a whole, the majority of emissions are in the form of BOD, dissolved solids, suspended solids, and oil and grease. One specific example of a product of this industry follows.

Phthalic anhydride is produced primarily by oxidizing naphthalene vapors with excess air over a catalyst, usually V_2O_5 . The excess air from the production of phthalic anhydride contains some uncondensed phthalic anhydride, maleic anhydride, quinones, and other organics. The venting of this stream to the atmosphere is the major source of organic emissions. Uncontrolled, these emissions are approximately 32 pounds per ton. Following catalytic combustion, one type of control, the emission level is reduced to 11 pounds per ton.

2861 Gum and Wood Chemicals

The gum and wood chemicals industry includes firms which produce hardwood and softwood distillation products, wood and gum naval stores, charcoal, natural dyestuffs, and natural tanning materials. Taken as a whole, the major pollutants this industry generates are hydrocarbons and particulates.

Charcoal, a major product of this industry, is generally manufactured by destructive distillation; all the gases, tars, oils, acids, and water are driven from the wood leaving virtually pure carbon. All of these, except the gas, which contains methane, carbon monoxide, carbon dioxide, nitrogen oxides, and aldehydes are useful by-products. If a recovery plant is used, only the noncondensable gas is discharged into the atmosphere. No organic pollutants should escape into the atmosphere if the combustible gases are treated in an afterburner.

2895 Carbon Black

Carbon black is produced by the reaction of a hydrocarbon fuel such as oil or gas, or both, with a limited supply of air at 2500 to 3000 F. Part of the fuel is

burned to CO_2 , CO, and water to generate heat for combustion of fresh feed. The unburned carbon (a black fluffy particle) is carbon black.

In the channel black process (accounting for 83 percent of production) 1 to 1.5 pounds of carbon black is produced from 32 pounds of carbon available in the fuel. The balance is lost as CO, particulates, and hydrocarbons.

3111 Leather Tanning and Finishing

Establishments primarily engaged in tanning, currying, and finishing hides and skins into leather are included in this industry category. This industry also includes leather converters who buy hides and skins and have them processed into leather on a contract basis by others. The major emissions coming from plants in this industry are BOD, dissolved and suspended solids, and oil and grease. Much of these effluents occur during washing processes.

3271 Concrete Block and Brick and 3272 Concrete Products, Except Block and Brick

The first industry group includes companies which manufacture concrete building block and brick from a combination of cement and aggregate. The second industry produces a large variety of products. Particulates are the major form of pollution associated with both of these industries.

One example of a specific product firm in this group is concrete batching. Concrete batching plants store, convey, measure, and discharge the ingredients for making concrete to mixing or transportation equipment. Dust, the air contaminant from wet-concrete batching results from the materials used. Sand and aggregates for concrete production come directly from a rock and gravel plant. If the aggregate is very dry, it can create considerable dust when handled.

3295 Minerals and Earths, Ground or Otherwise Treated

This industry group is very similar to the concrete block and brick group, in that dust and other particulates are the major emissions. The establishments in this category crush, grind, pulverize, and otherwise prepare certain earths, rocks, minerals, or slag for sale, for industrial uses, or for further manufacture.

3331 Primary Copper

Copper is produced from low-grade sulfide ores by four steps: roasting, smelting, converting, and refining. The high temperatures attained in roasting, smelting, and converting cause volatilization of trace elements present in the raw

materials. Waste gases from the processes contain dust and sulfur oxide. Carbon monoxide and nitrogen oxides may also be emitted.

3332 Primary Lead

Primary lead is produced from ore containing both lead and zinc. Effluent gases from the roasting, sintering, and smelting operations contain considerable particulate matter and sulfur dioxide. Dust and fumes which may be emitted are generally recovered.

3333 Primary Zinc

Most zinc comes from zinc and lead ores. Another source is zinc oxide from fuming furnaces. Dust, fumes, and sulfur dioxide are emitted from zinc concentrate roasting or sintering operations.

The material in Chapter 3 was compiled in part from the following sources:

- (1) Standard Industrial Classification Manual,
Office of Statistical Standards, Washington,
D. C., 1967.
- (2) Compilation of Air Pollutant Emission Factors,
U. S. Environmental Protection Agency, Office
of Air Programs Publication No. AP-42, Research
Triangle Park, North Carolina, February, 1972.
- (3) Industrial Pollution Control Handbook, edited
by Herbert F. Lund, McGraw-Hill, Inc., 1971.
- (4) Air Pollution Engineering Manual, U. S. Department
of Health, Education, and Welfare, Public Health
Service, National Center for Air Pollution Control,
Cincinnati, Ohio, 1967.

CHAPTER 4. LAND-LABOR RATIOS

The Coastal Zone Act provides the guidelines and objectives for a land-use plan in the Coastal Zone of Delaware. Stimulus for the Act came from the realization that there is an increasing shortage of desirable coast land in Delaware, and that the demand for remaining land is growing rapidly.* Remaining coastal land is desired for many competing uses, and decisions must be made to allocate this land for appropriate uses. This chapter of the report directly addresses the question of how much land an average establishment in each of the 411 SIC industry categories requires.

The Coastal Zone Act states that a heavy industry is one that characteristically uses more than 20 acres of land.** This figure can be misleading if one assumes it refers to the actual land occupied by buildings. In actuality, this type of data does not adequately describe the demand for land. Generally, a firm will buy or obtain the rights for more land than their physical plant will occupy. Excess land is used for storage, parking, landscaping, security purposes, and provides a cushion for expansion potential. Whatever the reason for acquiring extra land, it becomes land that cannot be used for competing purposes. Therefore, it is felt that the most appropriate measure of land resource consumption is the total average land held by a firm in an industry type. These data were collected and calculated on a per-employee basis as well as on a per-establishment basis.***

The average manufacturing firm requires 8.7 acres of land per employee and 1,100 acres of land per establishment. There is significant variation in the individual industries, however. Measured by land area per employee, SIC 2121, Cigar Manufacturers, uses the least amount of land, or 0.07 acre per employee, and SIC 2061, Cane Sugar Minus Refining, uses the most which is 340 acres per employee. Land area per employee has a standard deviation of 21.2 acres. Measured by average establishment size, SIC 2371, Fur Goods Manufacturers, requires the least amount of land, while SIC 2211, Broad Woven Fabric Mills, requires the largest amount. The standard deviation of establishment size is 3,254 acres.

As is true with all the variables used in this report, these size variables represent average numbers for an industry. Some establishments within industry groups will use more, while others will use less land than average. To define a cut-off limit, the land area per establishment was chosen as the most meaningful variable. Industries with average sizes more than two standard deviations above the mean are considered extraordinarily heavy land users. The cutoff value is 7,600 acres per establishment. Twelve industries have average-sized establishments requiring at least this much land. Eleven industries have average land area per employee that is greater than two standard deviations above the mean. The industries that fall into these exceptionally high categories are listed in Tables 4-1 and 4-2. The entire listing of land-area data is presented in Tables 4-3 and 4-4.

*The Coastal Zone of Delaware, The Governor's Task Force on Marine and Coastal Affairs, July, 1972, pp xxv.

**The Coastal Zone Act, Section 1, Title 7, Delaware Code, Subsection 7003(e).

***Estimating Land and Floor Area Implicit in Employment Projections, Ide Associates, Incorporated, July, 1970.

TABLE 4-1. INDUSTRIES WITH AVERAGE NUMBER OF ACRES OF LAND AREA PER ESTABLISHMENT MORE THAN TWO STANDARD DEVIATIONS ABOVE THE MEAN

SIC	Industry	Acres per Establishment
2911	Petroleum Refining	7,630
3333	Primary Zinc Production	8,090
3221	Glass Containers	8,459
2062	Cane Sugar Refining	8,960
3331	Primary Copper Production	9,572
3511	Steam Engines and Turbines	10,139
2892	Explosives	11,647
3721	Aircraft	11,947
3531	Construction Machinery	15,765
3334	Primary Aluminum Production	17,116
2061	Cane Sugar Minus Refining	32,391
2211	Broad Woven Cotton Fabric	43,083

TABLE 4-2. INDUSTRIES WITH AVERAGE NUMBER OF ACRES OF LAND AREA PER EMPLOYEE MORE THAN TWO STANDARD DEVIATIONS ABOVE THE MEAN

SIC	Industry	Acres per Employee
3271	Concrete Blocks and Brick	53
3295	Minerals Ground or Treated	57
2879	Agricultural Pesticides	65
2872	Fertilizer Mixing	68
3499	Fabricated Metal Products, not elsewhere classified	72
3531	Construction Machinery	77
2211	Broad Woven Cotton Fabric	83
3231	Products of Purchased Glass	97
2084	Wines and Brandy	113
2061	Cane Sugar Minus Refining	340

TABLE 4-3. RANKED DATA FOR THE AVERAGE NUMBER OF ACRES
OF LAND AREA PER EMPLOYEE*

SIC Code	Scores	SIC Code	Scores	SIC Code	Scores	SIC Code	Scores	SIC Code	Scores	SIC Code	Scores
2782	1	3555	1	2645	3	2643	4	2893	7	3811	14
2771	1	3021	1	2646	3	2491	4	3511	7	2037	14
2542	1	3553	1	2647	3	3293	4	2895	7	2831	14
2013	1	3622	1	2445	3	3629	4	2393	7	3221	15
2072	1	3362	1	2441	3	3269	4	3356	7	3341	15
2791	1	2381	1	2442	3	2086	4	3357	7	2812	16
3548	1	3323	1	3652	3	2397	4	3264	7	2815	16
2073	1	3534	1	3843	3	2611	4	3262	7	3273	16
3861	1	3999	2	3567	3	3641	4	2046	7	2821	16
3631	1	2015	2	3633	3	2761	4	2044	7	2299	17
3639	1	2341	2	2011	3	3831	4	2043	7	3442	17
3636	1	2342	2	3582	3	2396	4	3263	7	3332	17
3635	1	2652	2	3586	3	2392	4	2099	8	3339	17
3634	1	3313	2	3532	3	2399	4	2651	8	3333	17
3632	1	3822	2	3461	3	2311	4	2844	8	3334	17
3951	1	2384	2	2823	3	3585	5	2649	8	3316	18
2052	1	3537	2	2824	3	3121	5	3261	8	3255	21
2655	1	2731	2	3253	3	3452	5	3599	8	2421	22
3541	1	3662	2	2822	3	2631	5	3449	8	2026	22
2992	1	2521	2	3211	3	2499	5	3841	8	3274	22
3644	1	2599	2	2519	3	2091	5	3497	8	3275	22
3579	1	2082	2	2269	3	2092	5	3492	8	2261	22
3821	1	2741	2	2262	3	2095	5	3493	8	2042	23
3851	1	3964	2	2514	3	2093	5	2841	9	3111	23
3491	1	2411	2	3561	3	3712	5	2094	9	3791	24
3671	1	3542	2	3544	3	3441	5	3259	9	2952	24
2022	1	3942	2	3569	3	3369	5	3742	9	3331	26
3576	1	3943	2	3079	3	2087	5	2432	9	3272	26
2389	1	3661	2	2661	3	2621	5	2098	9	2063	26
2387	1	2391	2	2031	3	2843	5	2085	10	2062	26
2386	1	2793	2	2036	3	3322	5	3741	10	3732	30
2385	1	3031	2	3692	3	3296	5	2871	10	2911	31
2024	1	3421	2	3721	3	2034	5	3564	10	2951	31
2721	1	3425	2	3722	3	3399	6	3566	10	3241	32
3991	1	3429	2	3723	3	3161	6	2511	10	2892	32
3996	1	2794	2	3299	3	2861	6	3953	10	3281	34
3994	1	3069	2	3496	3	2033	6	2591	10	2395	34
3611	1	2032	2	3694	3	3519	6	3522	10	2999	34
2752	1	2071	2	3432	3	3351	6	3431	10	3297	34
2021	1	3612	2	3623	3	3535	6	3479	10	2096	34
3715	1	3551	2	3799	3	2083	6	3714	10	2899	35
2045	1	2351	2	3842	4	2833	6	2431	11	2813	36
2051	1	2352	2	3651	4	2834	6	2429	11	3251	39
3229	1	2394	2	3433	4	3699	6	2433	11	3533	50
3672	1	2541	2	3711	4	3713	6	3471	11	3536	50
3674	1	3423	2	3451	4	2443	6	2818	11	2041	51
2751	1	3589	2	2654	4	2512	6	3352	12	3271	53
2522	1	3621	2	2023	4	3581	6	3941	12	3295	57
3554	1	3731	2	3411	4	3642	6	3444	13	2879	65
2515	1	3494	2	3446	4	2816	6	3443	13	2872	68
3151	1	3613	2	3572	4	2851	6	2426	13	3499	72
3673	1	3949	2	3573	4	2641	6	3291	13	3531	77
3679	1	2531	2	3574	4	2653	6	3565	13	2211	83
3562	1	2035	2	3321	4	3498	7	2842	14	3231	97
3751	1	3993	2	3729	4	3481	7	3315	14	2084	113
3624	1	2642	2	3011	4	3559	7	3691	14	2061	340
2097	1	2644	3	2819	4	2891	7	3292	14		

*Scores for less than one acre omitted and other scores rounded to whole number. The industry names which these codes represent may be found in Appendix A, Table A-1. The industries are listed in numerical order by SIC code.

TABLE 4-4. RANKED DATA FOR THE AVERAGE NUMBER OF
ACRES OF LAND AREA PER ESTABLISHMENT*

SIC Code	Scores	SIC Code	Scores	SIC Code	Scores	SIC Code	Scores	SIC Code	Scores	SIC Code	Scores
2371	2	2782	53	2052	135	3432	264	3673	568	3261	1,401
3913	3	2732	53	3821	140	3461	264	2426	571	3262	1,427
2131	5	2251	57	3579	140	2851	265	3732	581	3264	1,440
3131	5	2327	57	2071	143	2072	267	2654	591	2037	1,542
2711	6	3446	58	3423	145	2842	270	3841	592	2952	1,590
3142	8	2298	59	3953	146	3293	279	3493	593	3632	1,598
2121	8	3544	60	2491	147	3069	284	3612	601	3315	1,603
2363	8	2328	61	2531	149	3481	286	3822	610	3357	1,609
3199	9	3299	62	2111	150	2642	292	3313	624	2085	1,743
3911	9	3362	63	3964	150	3635	293	2653	629	2821	1,751
2411	9	2794	64	3644	154	3444	293	2895	631	3322	1,837
2337	10	2282	66	3399	154	3631	303	3259	633	3255	1,901
2335	10	2655	66	2429	155	2083	303	2641	644	2041	1,940
2323	11	2321	67	2381	158	2761	305	3341	658	3275	1,958
2753	13	2322	69	2036	160	3441	307	3442	666	3633	1,982
2339	13	2599	70	3554	160	3433	307	2311	674	3351	2,084
3912	14	2283	70	2399	162	2512	311	3662	676	2043	2,154
2361	14	2329	71	3537	163	3713	311	3281	690	2879	2,204
2331	14	2272	72	3317	163	2073	319	3271	700	3292	2,211
2097	15	2297	72	3611	165	3532	324	3585	707	3011	2,225
3962	15	3851	74	3699	166	3831	333	2651	713	3263	2,234
2259	17	3151	74	3031	166	3624	334	2082	728	3251	2,275
2369	17	2045	79	3634	167	2095	336	3671	732	2818	2,279
2791	17	2271	79	2086	169	3498	338	3621	743	2621	2,291
3141	18	3942	80	2341	171	2433	340	3564	745	3499	2,349
3963	20	3636	80	3425	173	2646	351	2813	746	3573	2,354
2279	21	2441	81	3842	173	2098	357	3296	762	3714	2,371
2253	22	2231	82	3639	175	2393	358	2834	765	2046	2,489
2256	23	2141	83	3079	182	3642	362	3674	786	3661	2,510
2751	23	3269	83	3569	183	3623	366	2999	796	3332	2,555
2021	24	2051	85	2031	183	2034	369	2299	798	3339	2,589
3361	26	2445	90	3861	186	2262	369	3694	804	3519	2,610
2022	27	2644	90	2392	187	2643	372	3497	805	2815	2,762

TABLE 4-4. (Continued)

SIC Code	Scores	SIC Code	Scores	SIC Code	Scores	SIC Code	Scores	SIC Code	Scores	SIC Code	Scores
2992	28	3643	91	2023	188	3229	372	2822	835	3712	2,976
3961	28	2652	94	3943	189	3629	375	3411	838	3722	2,981
2252	30	3949	95	3534	189	2032	380	3021	839	3723	3,112
2294	31	3843	95	3542	191	3161	393	3692	848	3231	3,219
2752	32	2254	95	3479	194	2421	398	2831	852	3316	3,336
2292	34	2295	97	3567	197	3535	398	3562	853	3352	3,449
3552	38	2384	97	3715	198	3494	405	2899	872	3297	3,662
3952	38	3799	97	3471	198	3561	408	2816	875	2084	3,773
3955	38	3871	97	2011	199	2841	408	3522	883	2261	3,789
2241	39	3589	98	3622	200	3613	409	3496	884	3742	4,112
3172	40	2284	98	2861	200	3586	413	3443	885	3572	4,407
2013	41	2521	98	2091	200	2395	415	3731	937	2823	4,414
2024	41	3553	99	2591	200	3369	419	3811	988	2096	4,438
2397	41	2385	102	2843	201	3253	421	2871	989	3533	4,550
3994	41	3555	104	3582	202	3449	429	3295	1,022	2824	4,551
2793	42	3491	105	2893	203	2649	432	3941	1,023	2063	4,687
3545	42	3451	106	2015	203	2092	436	3291	1,023	3241	5,391
2391	42	3951	107	3121	206	2833	437	3492	1,043	3536	5,969
2293	42	2731	108	2396	208	3996	437	3729	1,057	3741	5,994
3872	43	2352	108	3421	208	3272	439	2432	1,064	2812	7,113
2387	43	2035	110	2094	211	2951	445	2026	1,077	3711	7,181
3993	44	2291	111	2442	213	3581	453	3566	1,090	2911	7,630
2351	44	3541	112	2269	214	3672	454	3312	1,144	3333	8,090
3931	45	3599	114	2891	215	3323	455	2611	1,160	3221	8,459
2721	45	3391	115	2514	217	2661	456	3356	1,171	2062	8,960
3171	45	3548	117	3679	217	3559	472	3691	1,176	3331	9,572
2541	46	2499	118	2431	217	2044	490	3574	1,179	3511	10,139
3914	46	3576	120	3429	220	2819	498	3431	1,180	2892	11,647
2394	47	2519	125	2093	230	2296	499	3211	1,213	3721	11,947
2741	47	2771	126	2342	237	2844	510	2631	1,241	3531	15,765
2542	47	3565	127	2522	238	2033	518	3791	1,260	3334	17,116
3991	47	2281	128	3751	241	3452	524	2872	1,264	2061	32,391
2389	47	2645	128	2221	242	2042	527	3641	1,304	2211	43,083
3999	50	3551	128	2099	243	2511	528	3274	1,343		
2386	51	2087	130	3273	256	2647	535	3651	1,371		
2515	52	3652	130	2443	261	3321	551	3111	1,380		

*The industry names which these codes represent may be found in Appendix A, Table A-1. The industries are listed in numerical order by SIC code.

CHAPTER 5. INDUSTRIAL MULTIPLIER EFFECTS

The establishment in an area of certain economic activities will sometimes result in other associated activities locating in the same area. This is most likely to occur when industries are strongly linked in terms of dollar flows. These flows are shown in the transactions table of an input-output study done by the Office of Business Economics.* This table is a device used for characterizing and analyzing economic activity. Basically, it involves a tabular organization of transactions in which the sales (outputs) of a producing sector are distributed across a single horizontal row, while its purchases (inputs) are distributed down a single vertical column. The largest part of the transactions table shows the dollar values of purchases and sales between different producing sectors of the economy. These transactions involve materials and intermediate goods and services which are the inputs to the productive process. Each sector is shown, on the one hand, as selling part of its output to other producing sectors, and, on the other hand, as buying from other producing sectors the inputs that it needs. The sectors included here are the durable and nondurable goods manufacturers.

Tables 5-1 through 5-16 list manufacturing industries by input-output sector which sell inputs to or buy outputs from industries with a high-pollution potential. Sixteen high-pollution industrial sectors (I-0 sectors) are presented by the SIC's listed in Table 3-1. It should be pointed out that an input-output sector may include more than one SIC industry. Actually, 28 SIC industries are listed in Table 3-1. Three of these industries - primary copper, lead, and zinc - were not included in this analysis because it is extremely unlikely that any one of them would ever locate in Delaware because of raw-material requirements, no matter how strongly linked they were to a locating industry. The "amount" figures shown in all these tables as well as the total dollar inputs and outputs are given in millions of dollars at producers' prices.

Only the strongest or largest linkages for each sector are shown in the tables. Some of these industries such as petroleum refining and industrial chemicals are linked to nearly every manufacturing industry. There was no specific cutoff point for what constituted a strong linkage for all the industries. A qualitative evaluation was made in each case.

If an industry which is locating in Delaware is listed in one of these tables as having inputs to or outputs from the polluting industry mentioned in the names of Tables 5-1 through 5-16, then the possibility exists that the polluting industry may desire to locate in the same area.

*Input-Output Structure of the U. S. Economy, 1963, United States Department of Commerce, Vol. I, 1969.

TABLE 5-1. INDUSTRIES WHICH ARE LINKED TO THE MEAT PRODUCTS
INDUSTRIES; SECTOR: 14. 01, SIC CODE: 201

Inputs				Outputs			
Sector	SIC	Amount	Industry	Sector	SIC	Amount	Industry
24. 07	*	73. 6	Converted paper products, nec. **	14. 08	2032	110. 6	Canned specialties
25. 00	265	145. 1	Paperboard containers and boxes	14. 13	2037	107. 8	Frozen fruits and vegetables
26. 05	2751-2	62. 9	Commercial printing	14. 18	205	119. 1	Bakery products
32. 04	3079	155. 0	Miscellaneous plastics products	14. 27	2094	189. 8	Animal and marine fats and oils
39. 01	3411	152. 9	Metal cans	14. 29	2096	116. 8	Shortening and cooking oils
				27. 04	2861, 289	51. 9	Miscellaneous chemical products
				33. 00	3111, 3121	237. 5	Leather tanning and ind. leather prod.
Total Dollar Inputs: 18, 525. 7				Total Dollar Outputs: 18, 525. 7			

Source: U. S. Department of Commerce, Input-Output Structure of the U. S. Economy: 1963, Vol. I, 1969.

*2641, 2643, 2645, 2646, and 2649.

**Nec stands for not elsewhere classified.

TABLE 5-2. INDUSTRIES WHICH ARE LINKED TO THE NATURAL AND PROCESSED
CHEESE INDUSTRY; SECTOR: 14.03, SIC CODE: 2022

Inputs				Outputs			
Sector	SIC	Amount	Industry	Sector	SIC	Amount	Industry
14.06	2026	115.8	Fluid milk	14.02	2021	14.7	Creamery butter
24.07	*	18.5	Converted paper products, nec. **	14.06	2026	53.1	Fluid milk
25.00	265	17.9	Paperboard containers and boxes				
32.04	3079	13.3	Miscellaneous plastics products				
Total Dollar Inputs: 89.8				Total Dollar Outputs: 89.8			

Source: U. S. Department of Commerce, Input-Output Structure of the U. S. Economy: 1963, Vol. I, 1969.

*2641, 2643, 2645, 2646, and 2649.

**Nec stands for not elsewhere classified.

TABLE 5-3. INDUSTRIES WHICH ARE LINKED TO THE FLUID MILK INDUSTRY;
SECTOR: 14.06, SIC CODE: 2026

Inputs				Outputs			
Sector	SIC	Amount	Industry	Sector	SIC	Amount	Industry
14.02	2021	128.5	Creamery butter	14.02	2021	243.2	Creamery butter
14.03	2022	53.1	Cheese, natural and processed	14.03	2022	115.8	Cheese, natural and processed
14.04	2023	180.9	Condensed and evaporated milk	14.04	2023	269.6	Condensed and evaporated milk
25.00	265	282.7	Paperboard containers and boxes	14.05	2024	3327	Ice cream and frozen desserts
31.01	2911, 299	49.4	Petroleum refining and related products				
Total Dollar Inputs: 912.4				Total Dollar Outputs: 912.4			

Source: U. S. Department of Commerce, Input-Output Structure of the U. S. Economy: 1963, Vol. I, 1969.

TABLE 5-4. INDUSTRIES WHICH ARE LINKED TO THE RICE MILLING INDUSTRY;
SECTOR: 14.16, SIC CODE: 2044

Inputs				Outputs			
Sector	SIC	Amount	Industry	Sector	SIC	Amount	Industry
19.03	2393-9	15.6	Fabricated textile products, nec. ***	14.14	*	42.1	Flour and cereal preparations
24.07	**	11.1	Converted paper products, nec. ***	14.21	2082-5	12.8	Alcoholic beverages

Total Dollar Inputs: 422.1

Total Dollar Outputs: 422.1

Source: U. S. Department of Commerce, Input-Output Structure of the U. S. Economy: 1963, Vol. I, 1969.

*2041, 2043, and 2045.

**2641, 2643, 2645, 2646, and 2649.

***Nec means not elsewhere classified.

TABLE 5-5. INDUSTRIES WHICH ARE LINKED TO THE ALCOHOLIC BEVERAGE INDUSTRIES; SECTOR: 14.21, SIC CODES: 2082-5

Inputs				Outputs			
Sector	SIC	Amount	Industry	Sector	SIC	Amount	Industry
14.14	*	43.6	Flour and cereal preparations	14.15	2042	45.8	Prepared foods for animals and fowls
21.00	244	39.8	Wooden containers	27.01	281	15.3	Industrial inorganic and organic chemicals
24.07	**	60.1	Converted paper products, nec. ***				
25.00	265	41.3	Paperboard containers and boxes				
35.02	3221	244.2	Glass containers				
39.01	3411	351.1	Metal cans				
41.02	3461	65.8	Metal stampings				
Total Dollar Inputs: 6,824.7				Total Dollar Outputs: 6,824.7			

Source: U. S. Department of Commerce, Input-Output Structure of the U. S. Economy: 1963, Vol. I, 1969.

*2041, 2043, and 2045.

**2641, 2643, 2645, 2646, and 2649.

***Nec means not elsewhere classified.

TABLE 5-6. INDUSTRIES WHICH ARE LINKED TO LOGGING CAMPS AND LOGGING CONTRACTORS INDUSTRIES; SECTOR: 20.01, SIC CODE: 2411

Inputs				Outputs			
Sector	SIC	Amount	Industry	Sector	SIC	Amount	Industry
20.02	2421	94.7	Sawmills and planing mills, general	20.02	2421	1037.2	Sawmills and planing mills, general
20.06	2432	11.4	Veneer and plywood	20.04	2429	29.3	Special products sawmills, nec.*
31.01	2911, 299	15.5	Petroleum refining and related products	20.06	2432	303.1	Veneer and plywood
37.01	331	25.0	Blast furnace and basic steel products	20.08	2491	53.0	Wood preserving
				24.02	2621	269.0	Paper mills, except building paper
				24.03	2631	216.4	Paperboard mills
Total Dollar Inputs: 2,454.9				Total Dollar Outputs: 2,454.9			

Source: U. S. Department of Commerce, Input-Output Structure of the U. S. Economy: 1963, Vol. I, 1969.

*Nec means not elsewhere classified.

TABLE 5-7. INDUSTRIES WHICH ARE LINKED TO GENERAL SAWMILLS AND
PLANING MILLS; SECTOR: 20.02, SIC CODE: 2421

Inputs				Outputs			
Sector	SIC	Amount	Industry	Sector	SIC	Amount	Industry
20.01	2411	1037.2	Logging camps and logging contractors	20.01	2411	94.7	Logging camps and logging contractors
20.03	2426	20.2	Hardwood dimension and flooring	20.03	2426	138.5	Hardwood dimension and flooring
20.06	2432	46.7	Veneer and plywood	20.04	2429	80.0	Special products saw-mills, nec.*
31.01	2911, 299	21.7	Petroleum refining and related products	20.05	2431	338.7	Millwork
36.16	3291	21.1	Abrasive products	20.06	2432	65.0	Veneer and plywood
				20.07	2433	96.7	Prefabricated wood structures
				20.08	2491	37.5	Wood preserving
				20.09	2499	124.1	Wood products, nec.*
				21.00	244	77.7	Wooden containers
				22.01	2511, 2519	169.4	Wood household furniture
				22.02	2512	29.8	Upholstered household furniture
				27.04	2861, 289	20.7	Miscellaneous chemical products
				61.06	3731	20.1	Shipbuilding and repairing
Total Dollar Inputs: 3,555.8				Total Dollar Outputs: 3,555.8			

Source: U. S. Department of Commerce, Input-Output Structure of the U. S. Economy: 1963, Vol. I, 1969.

*Nec means not elsewhere classified.

TABLE 5-8. INDUSTRIES WHICH ARE LINKED TO PULP MILLS;
SECTOR: 24.01, SIC CODE: 2611

Sector	SIC	Inputs		Sector	SIC	Outputs	
		Amount	Industry			Amount	Industry
20.01	2411	100.6	Logging camps and contractors	24.02	2621	601.1	Paper mills, except building paper
24.02	2621	137.4	Paper mills, except building paper	24.03	2631	145.6	Paperboard mills
24.03	2631	49.5	Paperboard mills	28.03	2823	133.7	Cellulosic man-made fibers
27.01	281	47.1	Industrial inorganic and organic chemicals				

Total Dollar Inputs: 1,157.1

Total Dollar Outputs: 1,157.1

Source: U. S. Department of Commerce, Input-Output Structure of the U. S. Economy: 1963, Vol. I, 1969.

TABLE 5-9. INDUSTRIES WHICH ARE LINKED TO THE INDUSTRIAL INORGANIC AND ORGANIC CHEMICALS INDUSTRIES; SECTOR: 27.01, SIC CODE: 281

Sector	SIC	Inputs		Sector	SIC	Outputs	
		Amount	Industry			Amount	Industry
27.02	2871-2	87.3	Fertilizers	16.01	*	274.9	Broadwoven fabric mills and finishing plants
27.04	2861, 289	100.0	Miscellaneous chemical products	24.02	2621	162.2	Paper mills, except building paper
28.01	2821	152.9	Plastics materials and resins	26.05	2751-2	158.6	Commercial printing
31.01	2911, 299	955.5	Petroleum refining and related products	27.02	2871-2	412.2	Fertilizers
37.01	331	199.8	Blast furnace and basic steel products	27.03	2879	238.5	Agricultural chemicals, nec. **
38.02	3332	84.0	Primary lead	27.04	2861, 289	468.7	Miscellaneous chemical products
42.08	3494, 3498	83.1	Pipe, valves, and pipe fittings	28.01	2821	1324.3	Plastics materials and resins
48.06	3559	148.3	Special industry machinery, nec. **	28.02	2822	408.9	Synthetic rubber
				28.03	2823	115.9	Cellulosic man-made fiber
				28.04	2824	404.7	Organic fibers, noncellulosic
				29.01	283	202.5	Drugs
				29.02	284	517.7	Cleaning preparation
				30.00	2851	417.9	Paints and allied products
				30.01	2911, 299	503.3	Petroleum refining and related products
				32.03	3031, 3069	142.0	Reclaimed rubber and miscellaneous rubber, nec. **
				35.02	3221	103.7	Glass containers
				37.01	331	351.1	Blast furnace and basic steel products
				63.03	3861	133.1	Photographic equipment and supplies

Total Dollar Inputs: 12,613.2

Total Dollar Outputs: 12,613.2

Source: U. S. Department of Commerce, Input-Output Structure of the U. S. Economy: 1963, Vol. I, 1969.

*2211, 2221, 2231, 2261, and 2262.

**Nec means not elsewhere classified.

TABLE 5-10. INDUSTRIES WHICH ARE LINKED TO AGRICULTURAL CHEMICALS, NOT ELSEWHERE CLASSIFIED, INDUSTRIES; SECTOR: 27.03, SIC CODE: 2879

Inputs				Outputs			
Sector	SIC	Amount	Industry	Sector	SIC	Amount	Industry
27.01	281	238.5	Industrial inorganic and organic chemicals	27.01	281	18.9	Industrial inorganic and organic chemicals
27.02	2871-2	21.8	Fertilizers				
27.04	3861, 289	25.5	Miscellaneous chemical products				
Total Dollar Inputs: 583.3				Total Dollar Outputs: 583.3			

Source: U. S. Department of Commerce, Input-Output Structure of the U. S. Economy: 1963, Vol. I, 1969.

TABLE 5-11. INDUSTRIES WHICH ARE LINKED TO MISCELLANEOUS CHEMICAL PRODUCTS INDUSTRIES; SECTOR: 27.04, SIC CODES: 2861 AND 289

Inputs				Outputs			
Sector	SIC	Amount	Industry	Sector	SIC	Amount	Industry
14.01	201	51.9	Meat products	24.07	*	77.8	Converted paper, nec. **
14.27	2094	44.2	Animal and marine fats and oils	25.00	265	81.2	Paperboard containers and boxes
27.01	281	468.7	Industrial inorganic and organic chemicals	26.05	2751-2	145.8	Commercial printing
28.01	2821	86.2	Plastics materials and and resins	27.01	281	100.0	Industrial inorganic and organic chemicals
29.01	283	50.0	Drugs	28.01	2821	97.5	Plastics materials and resins
30.00	2851	46.4	Paints and allied products	29.02	284	90.1	Cleaning preparations
31.01	2911, 299	70.6	Petroleum refining and related products	31.01	2911, 299	70.4	Petroleum refining and related products
				32.01	3011	77.0	Tires and inner tubes

Total Dollar Outputs: 2,715.3

Total Dollar Outputs: 2,715.3

Source: U. S. Department of Commerce, Input-Output Structure of the U. S. Economy: 1963, Vol. I, 1969.

*2641, 2643, 2645, 2646, and 2649.

**Nec means not elsewhere classified.

TABLE 5-12. INDUSTRIES WHICH ARE LINKED TO PETROLEUM REFINING;
SECTOR: 31.01, SIC CODE: 2911

Inputs				Outputs			
Sector	SIC	Amount	Industry	Sector	SIC	Amount	Industry
27.01	281	503.3	Industrial inorganic and organic chemicals	27.01	281	955.5	Industrial inorganic and organic chemicals
27.04	2861, 289	70.4	Miscellaneous chemical products	30.00	2851	102.4	Paints and allied products
39.02	3491	71.6	Metal barrels, drums, and pails	31.02	2951	114.3	Paving mixtures and blocks
				31.03	2952	88.8	Asphalt felts and coatings
				37.01	331	132.9	Blast furnace and basic steel products
Total Dollar Inputs: 20,858.5				Total Dollar Outputs: 20,858.5			

Source: U. S. Department of Commerce, Input-Output Structure of the U. S. Economy: 1963, Vol. I, 1969.

TABLE 5-13. INDUSTRIES WHICH ARE LINKED TO LEATHER TANNING AND INDUSTRIAL LEATHER PRODUCTS INDUSTRIES; SECTOR: 33.00, SIC CODES: 3111 AND 3121

Inputs				Outputs			
Sector	SIC	Amount	Industry	Sector	SIC	Amount	Industry
14.01	201	237.5	Meat products	18.04	23	39.4	Apparel made from purchased material
29.02	284	39.1	Cleaning preparations	34.01	3131	57.7	Footwear cut stock
				34.02	314	467.1	Footwear except rubber
				34.03	*	82.4	Other leather products
Total Dollar Inputs: 967.0				Total Dollar Outputs: 967.0			

Source: U. S. Department of Commerce, Input-Output Structure of the U. S. Economy: 1963, Vol. I, 1969.
 *3151, 3161, 317, and 3199.

TABLE 5-14. INDUSTRIES WHICH ARE LINKED TO THE CONCRETE BLOCK AND BRICK INDUSTRIES; SECTOR: 36.10, SIC CODE: 3271

Inputs				Outputs			
Sector	SIC	Amount	Industry	Sector	SIC	Amount	Industry
36.01	3241	65.6	Hydraulic cement	36.11	3272	20.2	Concrete products, nec.*
36.11	3272	21.9	Concrete products, nec.*	36.12	3273	10.5	Ready-mixed concrete
36.12	3273	53.1	Ready-mixed concrete				
36.19	3295	22.1	Ground or treated minerals				
Total Dollar Inputs: 533.5				Total Dollar Outputs: 533.5			

Source: U. S. Department of Commerce, Input-Output Structure of the U. S. Economy: 1963, Vol. I, 1969.

*Nec means not elsewhere classified.

TABLE 5-15. INDUSTRIES WHICH ARE LINKED TO THE GROUND OR TREATED
MINERALS INDUSTRIES; SECTOR: 36.19, SIC CODE: 3295

Inputs				Outputs			
Sector	SIC	Amount	Industry	Sector	SIC	Amount	Industry
19.03	2393-9	19.9	Fabricated textile products, nec. **	31.03	2952	31.1	Asphalt felts and coatings
24.07	*	10.7	Converted paper products, nec. **	36.10	3271	22.1	Concrete block and brick
37.01	331	31.4	Blast furnace and basic steel products	36.14	3275	26.8	Gypsum products
				36.21	3297	32.1	Nonclay refractories
Total Dollar Inputs: 271.3				Total Dollar Outputs: 271.3			

Source: U. S. Department of Commerce, Input-Output Structure of the U. S. Economy: 1963, Vol. I, 1969.

*2641, 2643, 2645, 2646, and 2649.

**Nec means not elsewhere classified.

TABLE 5-16. INDUSTRIES WHICH ARE LINKED TO BLAST FURNACE AND BASIC STEEL
PRODUCTS INDUSTRIES; SECTOR: 37.01, SIC CODE: 331

Inputs				Outputs			
Sector	SIC	Amount	Industry	Sector	Amount	Industry	
27.01	281	351.1	Industrial inorganic and organic chemicals	27.01	281	199.8	Industrial inorganic and organic chemicals
31.01	2911, 299	132.9	Petroleum refining and related products	37.02	332	513.8	Iron and steel foundries
37.02	332	273.8	Iron and steel foundries	37.03	3391	472.6	Iron and steel forgings
38.05	3339	250.9	Primary nonferrous metals, nec.*	39.01	3411	874.8	Metal cans
41.01	345	144.8	Screw machine products and bolts, nuts, etc.	39.02	3491	118.0	Metal barrels, drums, and pails
42.04	3471, 3479	182.2	Coating, engraving, and allied services	40.04	3441	705.9	Fabricated structural steel
53.07	3624	114.5	Carbon and graphite products	40.06	3443	481.4	Fabricated plate work
Total Dollar Inputs: 19,988.6				40.07	3444	344.5	Steel metal work
				40.09	3449	300.9	Miscellaneous metal work
				41.01	345	406.0	Screw machine products and bolts, nuts, etc.
				41.02	3461	622.0	Metal stampings
				42.03	3429	172.3	Hardware, nec.*
				42.05	3481	691.0	Miscellaneous fabricated wire products

TABLE 5-16. (Continued)

Inputs				Outputs			
Sector	SIC	Amount	Industry	Sector	SIC	Amount	Industry
				42.08	3494, 3498	146.6	Pipe, valves, and pipe fittings
				42.11	3499	133.8	Fabricated metal products, nec.*
				44.00	3522	284.0	Farm machinery
				45.01	3531	195.0	Construction machinery
				47.03	3544-5	157.1	Special dies, tools, and accessories
				49.02	3562	153.2	Ball and roller bearings
				50.00	359	122.2	Machine shop products
				53.04	3621	138.5	Motors and generators
				54.02	3632	101.7	Household refrigerators and freezers
				55.03	3643-4	115.2	Wiring devices
				59.03	3717	2008.7	Motor vehicles and parts
				61.01	3731	125.0	Shipbuilding and repairing
				61.04	3742	216.1	Railroad and street cars
				Total Dollar Outputs: 19,988.6			

Source: U. S. Department of Commerce, Input-Output Structure of the U. S. Economy: 1963, Vol. I, 1969.

*Nec means not elsewhere classified.

CHAPTER 6. ENERGY AND WATER USAGE

Conservation of Delaware's Coastal Zone is being promoted by the restriction of certain types of industrial activity. The amount of water and energy required by the various industrial users in the Zone could produce environmental problems. Heavy energy-using industries intensify energy demands and could serve to stimulate energy production in the Zone. Energy production requires the conversion of natural fuels into power. Typically, this implies electric generating stations that convert coal or atomic energy into electricity. Coal-burning power plants create visual pollution and emit sulfur dioxide. If gas is the selected fuel, the natural gas shortages become important. Also, pipelines and synthetic natural gas plants could seek locations in the Coastal Zone and bring with them associated environmental problems.

Heavy water-using industries provide a unique problem for sites in the Coastal Zone. Most of the Coastal Zone has potential problems with salt-water intrusion. At present, intrusion is controlled by not withdrawing more water than aquifers are capable of recharging naturally. Should exceptionally heavy water-using industries locate in the Zone, the balance between withdrawal and recharge could be upset.

In order to identify industries that are potentially not compatible with the Coastal Zone environment because of energy and water intake, four sets of data were collected:

- (1) Fuel oil used, 1000 barrels/year
- (2) Gas used, million cubic feet/year
- (3) Electricity used, million kilowatt hours/year
- (4) Water intake, 1000 gallons/year.*

Both per employee data and data for average-sized establishments were computed. Since each industry applying for a location in the Coastal Zone will have its own unique employment expectation, the per capita data will be most meaningful for evaluating industry applicants.

Thus, the four components of energy and water consumption actually are represented by eight variables. For each of the eight variables, the mean and standard deviation of the data were computed. The results are presented below:

<u>Variable</u>	<u>Mean</u>	<u>Standard Deviation</u>
Fuel oil used per employee per year	21.3 (1000 barrels)	34.7
Fuel oil per establishment per year	4256.6 (1000 barrels)	10,938.7

* All four are from: U. S. Bureau of the Census, Census of Manufactures, 1967, Volume II, Industry Statistics, Table 7B.

Variable	Mean	Standard Deviation
Gas used per employee per year	691.2 (million cubic feet)	1,339.5
Gas used per establishment per year	164,302.2 (million cubic feet)	509,731.8
Electricity used per employee per year	49.4 (million kilowatt hours)	152.8
Electricity used per establishment per year	17,223.2 (million kilowatt hours)	120,738.9
Water intake per employee per year	20,048.1 (1000 gallons)	50,190.3
Water intake per establishment	4,631,323.6 (1000 gallons)	15,672,397.9

The data were rank ordered and are shown in Tables 6-9 to 6-16. All industries with energy consumption data greater than two standard deviations above the mean are considered extraordinarily heavy energy and water consumers. These industries are listed in the following tables (Tables 6-1 to 6-8). Care should be exercised in allowing firms from these industry groups to locate in the region because of the propensity to be heavy consumers. Small-sized firms should pose no problems, however, since their total consumption will be small even though the "per employee" consumption is high.

TABLE 6-1. INDUSTRIES WITH FUEL OIL USED PER EMPLOYEE PER YEAR MORE THAN TWO STANDARD DEVIATIONS ABOVE THE MEAN

SIC	Industry	Thousand Barrels
2891	Adhesives and gelatin	79
3241	Hydraulic cement	80
3275	Gypsum products	82
2621	Paper mills	118
2816	Inorganic pigments	118
3331	Primary copper production	135
2833	Medicinal chemicals	148
2951	Paving mixtures and blocks	195
2631	Paperboard mills	249

TABLE 6-2. INDUSTRIES WITH FUEL OIL USED PER AVERAGE-SIZED ESTABLISHMENT PER YEAR MORE THAN TWO STANDARD DEVIATIONS ABOVE THE MEAN

SIC	Industry	Thousand Barrels
3021	Rubber footwear	23,519
3511	Steam engines and turbines	36,162
2621	Paper mills	46,949
3331	Primary copper production	49,215
2631	Paperboard mills	58,980
3312	Blast furnaces, steel works	93,795

TABLE 6-3. INDUSTRIES WITH GAS USED PER EMPLOYEE PER YEAR MORE THAN TWO STANDARD DEVIATIONS ABOVE THE MEAN

SIC	Industry	Million Cubic Feet
2822	Synthetic rubber	2,877
3333	Primary zinc production	3,376
2083	Malt	3,570
2819	Inorganic chemicals, not elsewhere classified	4,187
3274	Lime	4,411
2895	Carbon black	5,470
3334	Primary aluminum production	5,496
3241	Hydraulic cement	5,613
2818	Organic chemicals, not else- where classified	5,799
2911	Petroleum refining	10,495

TABLE 6-4. INDUSTRIES WITH GAS USED PER AVERAGE-SIZED ESTABLISHMENT PER YEAR MORE THAN TWO STANDARD DEVIATIONS ABOVE THE MEAN

SIC	Industry	Million Cubic Feet
2818	Organic chemicals, not else- where classified	1,130,281
3333	Primary zinc production	1,519,216
3312	Blast furnaces steel works	2,163,480
2911	Petroleum refining	2,562,546
3334	Primary aluminum production	5,232,612

TABLE 6-5. INDUSTRIES WITH PURCHASED ELECTRIC ENERGY PER EMPLOYEE PER YEAR MORE THAN TWO STANDARD DEVIATIONS ABOVE THE MEAN

SIC	Industry	Million Kilowatt Hours
3339	Primary nonferrous production	346
2812	Alkalies and chlorine	484
2819	Inorganic chemicals, not elsewhere classified	542
2813	Industrial gases	657
3313	Electrometallurgical product	755
3334	Primary aluminum production	1,762

TABLE 6-6. INDUSTRIES WITH PURCHASED ELECTRIC ENERGY PER AVERAGE-SIZED ESTABLISHMENT PER YEAR MORE THAN TWO STANDARD DEVIATIONS ABOVE THE MEAN

SIC	Industry	Million Kilowatt Hours
2334	Primary aluminum production	1,678,276

TABLE 6-7. INDUSTRIES WITH WATER INTAKE PER EMPLOYEE PER YEAR MORE THAN TWO STANDARD DEVIATIONS ABOVE THE MEAN

SIC	Industry	Thousand Gallons
2871	Fertilizers	118,437
2631	Paperboard mills	122,043
2911	Petroleum refining	143,119
3295	Minerals ground or treated	173,846
2061	Cane sugar minus refining	197,241
2812	Alkalies and chlorine	215,865
2818	Organic chemicals, not elsewhere classified	243,215
2611	Pulp mills	257,714
3339	Primary nonferrous products, not elsewhere classified	271,087
3313	Electrometallurgical product	342,758
2813	Industrial gases	384,583

TABLE 6-8. INDUSTRIES WITH WATER INTAKE PER AVERAGE-SIZED ESTABLISHMENT PER YEAR MORE THAN TWO STANDARD DEVIATIONS ABOVE THE MEAN

SIC	Industry	Thousand Gallons
2911	Petroelum refining	34,944,032
2621	Paper mills	35,285,793
3339	Primary nonferrous products, not elsewhere classified	39,036,528
2824	Synthetic organic fibers	41,929,173
2818	Organic chemicals, not else- where classified	47,397,914
2611	Pulp mills	63,794,597
2823	Cellulosic man-made fibers	79,466,705
3334	Primary aluminum production	82,654,544
2812	Alkalies and chlorine	94,195,244
3313	Electrometallurgical product	104,843,000
3312	Blast furnaces, steel works	129,080,146

TABLE 6-9. RANKED DATA FOR WATER INTAKE PER EMPLOYEE PER YEAR
(in 1000 gallons)*

SIC Code	Scores	SIC Code	Scores	SIC Code	Scores	SIC Code	Scores	SIC Code	Scores	SIC Code	Scores
3542	357	3643	1,125	3433	2,000	3714	3,926	3317	7,300	2094	24,210
3651	372	3021	1,132	3429	2,017	2992	4,000	3914	7,384	2093	24,285
3537	377	3961	1,142	3323	2,025	2297	4,074	3011	7,642	2023	25,000
3141	444	2111	1,165	3531	2,032	2283	4,137	3316	7,685	2092	26,862
3831	487	3562	1,194	3559	2,041	2043	4,141	3851	7,699	2824	29,321
3811	496	3585	1,205	3621	2,076	2013	4,149	2033	7,779	2298	30,000
3574	500	2654	1,295	3442	2,089	3357	4,301	3356	8,055	2899	31,684
3253	526	3694	1,338	2221	2,090	2256	4,380	2041	8,378	3273	32,916
3671	537	3461	1,339	2282	2,093	2036	4,418	2032	8,522	2843	36,296
3581	606	3672	1,342	3634	2,110	3341	4,444	3111	8,554	2661	39,569
3931	681	3566	1,343	3544	2,121	2095	4,500	2022	8,636	3332	40,000
3551	689	3679	1,344	3481	2,121	2842	4,545	2034	8,679	2891	42,142
3586	714	3494	1,363	3644	2,134	2834	4,568	3299	8,888	2063	43,047
3623	714	3711	1,404	3519	2,240	2272	4,568	2647	8,890	2821	43,591
3545	750	3613	1,419	3229	2,287	3322	4,580	2651	9,259	2046	45,182
3611	757	3553	1,428	3552	2,300	2035	4,923	3421	9,333	3241	45,190
2511	775	3441	1,443	3425	2,352	3231	4,947	2643	9,523	2822	54,260
2296	779	3444	1,458	2831	2,413	3522	4,984	2042	9,636	2815	55,640
3561	810	3423	1,473	3255	2,500	2491	5,000	3399	10,000	2823	57,295
2522	819	2254	1,484	2211	2,503	2295	5,125	2999	10,000	2083	57,333
3541	841	2253	1,507	3362	2,647	3315	5,220	2951	10,000	2861	57,500
3532	869	3498	1,538	2071	2,741	3069	5,582	3281	10,243	2892	59,260
3264	875	3673	1,546	3861	2,819	2026	5,592	2261	10,601	3331	60,416
2051	876	3639	1,571	3964	2,820	2087	5,600	3471	10,714	3333	64,391
3411	892	3533	1,595	3629	2,931	2031	5,853	2432	11,543	2097	67,142
3822	904	3871	1,605	3999	2,985	3292	5,970	2499	12,111	2833	68,275
2844	909	3599	1,612	2086	3,024	3321	6,006	2646	12,162	2062	75,315
3692	909	2052	1,615	2299	3,043	3079	6,080	3351	12,172	3312	79,661
3641	918	3432	1,666	3391	3,141	3361	6,187	2082	12,234	2819	81,198
3572	943	3612	1,696	3691	3,146	2284	6,301	2099	12,266	3334	86,822
3631	978	3573	1,712	3632	3,202	3296	6,310	2084	13,043	2621	89,222
3443	982	3221	1,746	3291	3,333	2641	6,434	2841	13,576	2816	102,580
2251	1,000	3633	1,758	3431	3,333	2015	6,501	2952	14,038	2871	118,437
3821	1,003	2281	1,770	3261	3,333	2231	6,583	2262	14,230	2631	122,043
3622	1,011	3652	1,829	3491	3,333	3479	6,666	3297	15,000	2911	143,119
3715	1,025	3499	1,868	3569	3,478	3722	6,693	2037	15,173	3295	173,846
3729	1,034	3211	1,884	3293	3,506	2011	6,730	3274	15,806	2061	197,241
3548	1,061	3731	1,887	3624	3,529	2851	6,800	2096	16,504	2812	215,865
3941	1,071	2241	1,914	3536	3,623	3275	7,049	2085	17,360	2818	243,215
2649	1,081	3369	1,923	3497	3,636	3352	7,156	3031	18,888	2611	257,714
3674	1,099	3642	1,923	2291	3,846	2269	7,230	3511	21,768	3339	271,087
2252	1,111	3842	1,980	3493	3,846	2024	7,272	2021	22,758	3313	342,758
										2813	384,583

* SIC for which no data are available are omitted. Intakes rounded to whole numbers. The industry names which these codes represent may be found in Appendix A, Table A-1. The industries are listed in numerical order by SIC code.

TABLE 6-10. RANKED DATA FOR WATER INTAKE PER ESTABLISHMENT PER YEAR
(in 1000 gallons)*

SIC Code	Scores	SIC Code	Scores	SIC Code	Scores	SIC Code	Scores	SIC Code	Scores	SIC Code	Scores
3599	21,612	3622	107,065	3494	195,117	3431	369,962	3069	664,867	2092	2,106,841
3537	29,029	2086	109,657	3429	195,344	3672	374,303	3211	703,710	2096	2,152,734
3542	29,792	3821	110,653	2052	197,288	2296	393,496	2899	768,341	3711	2,491,701
3444	32,520	3461	111,619	3613	201,682	2254	403,363	3321	781,278	2111	2,665,852
3831	33,487	3432	112,935	3692	204,083	3612	407,064	2643	791,618	2083	2,666,571
3961	33,509	3548	115,278	3281	209,692	3531	415,462	2651	802,225	2085	3,006,925
3811	33,806	2522	118,356	2024	210,471	3522	419,894	3296	821,463	3295	3,070,123
3551	35,022	3643	120,296	2282	213,925	2011	425,495	3421	831,037	3011	3,892,732
3544	36,421	3479	121,067	3293	215,509	3851	427,531	3714	855,811	3351	3,924,414
2511	39,601	2087	126,056	3255	217,250	3536	431,704	3357	886,217	2082	3,941,498
3545	39,637	3651	127,994	2042	218,071	2084	432,652	2231	887,692	2833	4,551,954
3581	40,408	3559	128,945	2999	234,000	2291	432,697	2952	894,533	2821	4,663,004
2051	48,076	2241	130,653	3629	239,579	2283	450,575	3519	920,860	3632	4,715,373
3931	49,491	3715	131,205	3291	251,164	2269	463,205	3292	921,484	2661	4,925,265
2649	55,114	3574	139,130	3639	253,702	3323	473,568	3274	926,577	3722	5,128,645
2844	56,146	2831	139,541	3729	254,705	3391	475,858	3573	951,721	3332	5,684,400
3499	60,937	2951	139,900	3641	255,729	3861	480,352	2284	957,812	3241	7,478,173
3443	64,674	3369	142,097	3399	257,600	3673	502,580	3221	970,479	2063	7,615,981
3623	66,572	3299	142,755	3491	259,497	2295	503,838	3572	981,136	2813	7,814,732
3253	69,734	2299	142,861	3493	259,772	3111	506,022	2093	1,006,885	2819	9,182,760
3498	71,247	3566	143,491	3691	261,724	3021	507,098	3633	1,115,208	2815	9,430,423
3999	75,612	3533	144,937	2851	264,248	3273	515,146	2043	1,122,774	2871	11,565,421
3553	75,915	3433	152,340	2026	265,405	3229	525,484	2023	1,134,000	2816	13,188,787
3652	77,507	2071	157,385	2499	269,593	3674	530,642	3356	1,208,340	2046	14,157,032
3441	79,165	3264	158,445	3822	270,490	2834	532,526	2891	1,212,872	2822	14,243,486
3423	79,314	2491	162,650	2095	272,025	2034	541,234	2843	1,261,659	2061	18,773,474
3442	81,118	3231	162,868	3631	273,385	3261	549,027	2432	1,261,715	2892	21,127,624
3541	81,273	3552	163,047	3694	275,725	2097	559,971	2211	1,291,984	3331	21,901,053
3481	82,387	2251	163,100	3644	280,961	2094	564,104	3317	1,305,313	2062	25,474,647
3611	85,268	3679	163,347	3361	281,884	3914	564,257	2032	1,324,605	2631	28,893,893
3842	85,940	2013	164,286	3871	287,406	3562	566,514	3031	1,337,900	3333	28,976,175
3941	86,311	3585	167,508	2031	289,055	3621	572,788	3316	1,400,550	3511	29,185,362
2842	87,819	2022	168,323	3671	289,476	2221	573,243	2646	1,404,977	2911	34,944,032
3362	88,730	3425	174,396	2256	293,911	3315	593,843	3322	1,436,259	2621	35,285,793
3532	89,012	3411	179,889	2297	299,568	2272	595,412	2647	1,564,728	3339	39,036,528
3141	92,759	3569	180,802	3079	306,198	2641	601,332	2262	1,569,657	2824	41,929,173
3586	93,294	3471	182,143	2041	317,457	3275	602,495	2037	1,607,307	2818	47,397,914
2253	94,394	2035	184,960	3634	324,589	2841	615,811	3297	1,614,150	2611	63,794,597
3561	96,110	2654	187,347	3497	333,348	3731	631,259	2261	1,752,215	2823	79,466,705
2252	96,721	3964	187,394	2281	349,828	2033	636,776	2298	1,810,800	3334	82,654,544
2992	98,000	3341	189,686	2099	362,971	3624	646,162	2861	1,844,025	2812	94,195,244
3642	102,424	2036	190,264	2021	366,641	2015	657,066	3352	2,018,779	3313	104,843,000
										3312	129,080,146

* Intakes rounded to whole number. The industry names which these codes represent may be found in Appendix A, Table A-1. The industries are listed in numerical order by SIC code.

TABLE 6-11. RANKED DATA FOR THE AMOUNT OF PURCHASED ELECTRIC ENERGY PER
AVERAGE-SIZED ESTABLISHMENT PER YEAR
(in kilowatt hours)*

SIC Code	Scores	SIC Code	Scores	SIC Code	Scores	SIC Code	Scores	SIC Code	Scores	SIC Code	Scores
2411	7	2499	359	2026	720	2295	1,651	3317	3,868	2046	11,022
2741	52	2899	361	3433	727	2834	1,684	3297	3,915	2813	13,368
3993	71	2851	366	2831	744	2063	1,692	3292	4,021	3351	13,448
2721	97	2131	376	3541	750	2641	1,737	3714	4,022	2661	14,438
3272	107	3569	395	3361	753	2141	1,750	2284	4,056	2815	14,542
2952	114	3231	402	3399	888	2032	1,771	3274	4,409	3511	14,644
3273	116	3423	402	3341	908	3255	1,873	3742	4,523	3011	14,695
2751	118	2021	403	2011	928	3069	1,881	2096	4,538	3211	15,442
2731	119	2951	403	2653	928	2085	1,892	2083	4,557	2211	17,485
3544	127	2732	405	3699	951	3291	1,920	3573	5,046	3352	17,718
2752	135	2426	406	3561	974	3431	1,940	3519	5,316	2631	18,707
3599	135	2891	435	2095	985	2062	2,000	3357	5,415	3221	19,414
2431	145	3441	440	3548	996	2283	2,118	2082	5,464	2823	20,552
3444	149	2013	470	3566	1,019	2262	2,207	3251	5,601	3632	23,258
3479	171	3362	472	2015	1,023	2041	2,271	3275	5,622	2296	24,130
2086	174	3642	486	3679	1,037	3691	2,275	3332	5,973	3624	24,935
2872	195	3559	505	3429	1,049	2037	2,284	3229	6,458	2111	26,143
2253	203	3545	509	3452	1,138	3662	2,294	2821	6,617	3331	26,868
3451	212	2071	517	2023	1,138	2432	2,352	3356	6,780	2818	27,414
2711	213	3271	521	2052	1,158	3261	2,396	2892	6,810	3721	27,839
3949	222	3552	524	2256	1,160	2261	2,503	2816	6,871	2611	30,485
2491	252	3941	539	3461	1,191	2833	2,513	3296	6,930	3711	31,570
2311	269	3821	603	2269	1,248	3315	2,533	2281	7,137	2822	32,716
3281	271	2094	615	2061	1,265	3729	2,566	3562	7,418	2621	36,092
3471	275	2121	631	3259	1,269	3531	2,587	3661	7,499	3241	38,046
3481	291	2241	633	3533	1,309	3321	2,644	3323	7,543	2911	39,985
3442	293	3522	646	3585	1,332	3621	2,646	2072	7,882	3339	49,850
2421	318	2042	661	3861	1,394	2231	2,659	2092	8,398	2819	61,378
3499	319	3295	662	3079	1,484	3391	2,742	2221	8,833	2824	63,480
2022	322	3443	695	2251	1,494	3731	2,816	3322	9,618	3333	82,944
2099	326	2841	701	3494	1,497	2282	3,202	2871	10,107	3312	105,758
2511	340	2033	705	2272	1,592	2073	3,304	3722	10,312	2812	211,316
2051	355	2861	706	3253	1,603	3411	3,326	2895	10,717	3313	230,939
										3334	1,678,276

* Data rounded to whole numbers. The industry names which these codes represent may be found in Appendix A, Table A-1. The industries are listed in numerical order by SIC code.

TABLE 6-12. RANKED DATA FOR THE AMOUNT OF PURCHASED ELECTRIC
ENERGY PER EMPLOYEE PER YEAR
(in million kolowatt hours)*

SIC Code	Scores	SIC Code	Scores	SIC Code	Scores	SIC Code	Scores	SIC Code	Scores	SIC Code	Scores
2411	1	2491	7	3494	10	2026	15	3315	22	2824	44
2952	1	3541	7	2872	10	2841	15	2021	25	3356	45
2311	1	3559	8	3443	10	3562	15	2023	25	2296	47
2731	2	3441	8	3742	10	3069	15	3291	25	3296	53
2741	2	3451	8	3429	10	3632	15	3292	26	2816	53
2721	3	3861	8	3511	10	2499	16	3357	26	2041	59
2253	3	2751	8	2085	10	3471	16	2094	26	2821	61
3993	4	3561	8	2099	11	2095	16	2284	26	3352	62
2131	4	3731	8	2073	11	3411	16	3691	27	3312	65
2086	4	3679	8	3452	11	3361	16	3229	28	3275	65
2121	4	2033	8	2032	11	2022	16	3011	28	3331	74
2711	5	3721	9	2111	11	2295	16	2951	28	3274	75
3821	5	2071	9	2013	11	2082	16	2042	29	2631	79
2062	5	3573	9	3253	12	2256	17	3079	29	2815	85
2752	6	3642	9	2272	12	3431	17	3322	30	2621	91
3272	6	2251	9	3231	12	3711	17	2282	31	2083	98
2051	6	3548	9	3531	12	3391	18	2072	31	3251	98
2511	6	2241	9	2831	12	2421	18	2221	32	2871	103
3444	6	2851	9	3519	12	3714	18	3323	32	2092	107
3941	6	3479	9	2141	13	2641	18	2211	33	2661	116
3949	6	2052	9	3281	13	3259	18	3399	34	2611	123
2732	6	3566	9	2061	13	2892	19	2096	34	2822	124
3661	6	3433	9	3722	13	2283	19	3221	34	2895	130
3662	7	2063	9	3362	14	2269	19	2046	35	3624	136
3552	7	3585	9	3461	14	2231	19	2281	36	2818	140
3544	7	3621	9	3533	14	2262	20	3297	36	2911	163
3273	7	3545	9	2834	14	3321	20	3295	37	3333	184
3423	7	2426	9	3261	14	3341	21	3699	37	3241	229
3481	7	3499	9	2011	14	2432	21	2833	37	3339	346
2431	7	3599	10	2823	14	3255	21	3271	39	2812	484
3442	7	2015	10	2899	14	2037	21	3211	41	2819	542
3569	7	2653	10	2891	15	3317	21	3351	41	2813	657
3522	7	3729	10	2261	15	2861	22	3332	42	3313	755
										3334	1,762

* Data rounded to whole numbers. The industry names which these codes represent may be found in Appendix A, Table A-1. The industries are listed in numerical order by SIC code.

TABLE 6-13. RANKED DATA FOR THE AMOUNT OF GAS USED PER AVERAGE-SIZED ESTABLISHMENT PER YEAR (in million cubic feet)*

SIC Code	Scores	SIC Code	Scores	SIC Code	Scores	SIC Code	Scores	SIC Code	Scores	SIC Code	Scores
3451	<1	2851	2,764	3566	7,694	2037	16,999	3356	55,020	2815	187,293
3471	2	3079	2,959	2073	7,739	2052	17,106	3317	55,296	3352	188,243
3479	3	2071	3,337	3729	7,797	2892	18,741	3323	68,997	3711	204,165
3461	4	3441	3,350	2141	7,801	2033	19,172	3313	74,108	3296	208,038
2721	7	3662	3,380	2231	7,946	2094	19,287	3351	76,217	3229	257,077
3452	9	3642	3,382	2015	7,947	3357	19,308	3253	76,426	3274	258,622
2741	13	2872	3,459	2899	8,082	3714	20,350	3011	85,548	2046	325,552
3399	14	2891	3,569	3548	8,200	3722	20,932	2111	86,212	2621	373,744
3391	82	3271	3,807	3522	8,534	3315	21,568	3511	87,359	2823	421,844
2411	217	3731	3,853	2951	9,504	2085	22,079	2061	87,963	2895	450,510
3499	326	2013	3,865	2042	9,611	3519	22,308	2082	99,658	2063	451,945
3599	364	3541	4,023	2641	9,945	2262	22,526	3261	105,959	2611	466,811
2711	391	2099	4,340	3585	10,103	2032	22,903	3322	108,915	2819	473,527
3544	474	3861	4,378	2295	10,141	3321	24,296	3297	111,192	2631	510,495
2752	506	2499	4,401	2833	10,222	3292	28,112	3721	114,418	3211	571,992
2511	551	3561	4,489	2653	10,547	2861	28,634	2871	123,581	2062	579,772
2751	551	3423	4,816	3494	11,227	3341	28,975	3624	124,408	2824	646,645
2121	1,013	3433	4,867	2269	11,270	3742	36,536	2096	126,882	2822	755,231
2732	1,016	2256	5,002	3621	11,629	2813	37,335	2092	127,218	3221	788,349
3444	1,236	2026	5,024	2221	11,779	2952	37,864	3251	135,231	3331	822,081
3559	1,443	3231	5,098	2432	12,121	2211	38,472	2816	139,317	3241	928,855
2421	1,564	2051	5,142	2011	12,751	2023	39,297	3259	153,244	2812	1,005,873
2086	1,622	3429	5,312	3361	14,094	3411	42,018	3255	160,226	2818	1,130,281
3481	1,777	2831	5,707	2072	14,735	3661	43,818	2661	162,453	3333	1,519,216
3679	1,793	2022	5,986	2841	15,415	3562	46,623	3339	165,672	3312	2,163,480
2131	1,899	3643	6,958	2021	15,730	2296	48,405	2083	166,063	2911	2,562,546
3273	2,126	3362	6,978	2491	16,489	3431	49,870	3332	168,052	3334	5,232,612
3442	2,404	2834	7,589	3295	16,506	2261	50,142	3275	170,647		
3272	2,410	3069	7,642	3531	16,557	2821	51,286	3632	182,433		

*Scores rounded to whole numbers. The industry names which these codes represent may be found in Appendix A, Table A-1. The industries are listed in numerical order by SIC code.

TABLE 6-14. RANKED DATA FOR THE AMOUNT OF GAS USED PER EMPLOYEE PER YEAR
(in million cubic feet)*

SIC Code	Scores	SIC Code	Scores	SIC Code	Scores	SIC Code	Scores	SIC Code	Scores	SIC Code	Scores
3451	<1	3561	37	2256	74	3272	144	2841	339	3332	1,182
3461	<1	2751	38	2211	74	2099	146	3322	347	2871	1,265
3452	<1	3661	40	3548	75	2032	147	3356	366	2661	1,305
3471	<1	3541	41	3494	78	2833	153	2042	424	3312	1,335
3479	<1	3621	42	2015	78	3231	154	3431	449	3221	1,418
2721	<1	2221	42	3531	80	2037	160	2824	452	3211	1,531
3391	<1	2086	44	3742	86	3011	167	2821	479	3296	1,598
3399	<1	3481	45	2421	89	2269	175	2491	506	2092	1,622
2741	<1	2411	50	3423	89	3292	182	3253	576	2062	1,714
2121	7	2892	52	3714	93	2872	186	2952	594	2813	1,837
2711	9	3519	54	3357	93	3321	186	3261	643	3255	1,843
3499	10	3429	54	2051	93	3315	189	3352	667	2611	1,885
3662	10	3444	55	2296	95	2499	197	3341	678	3275	1,996
2511	10	2071	58	2013	97	2011	201	2951	679	2631	2,156
3731	11	2141	58	3562	98	2262	204	3624	679	3331	2,267
3679	14	3079	58	2831	98	3362	208	2094	827	3259	2,275
2732	16	2231	58	3522	101	3411	208	2023	866	2812	2,305
3559	22	2072	59	2295	103	2033	234	2861	892	3251	2,370
2752	23	3441	61	3443	105	3351	236	2061	924	2063	2,554
2131	24	3442	61	2026	105	3313	242	3295	934	2822	2,877
3861	25	3642	63	2641	106	3271	288	2621	945	3333	3,376
2073	26	3433	63	2432	110	3323	295	2096	972	2083	3,570
3599	27	3069	64	3711	115	2261	303	2021	976	2819	4,187
3722	27	2834	65	2653	116	2823	304	3297	1,033	3274	4,411
3544	27	3511	65	3632	123	2022	307	2046	1,039	2895	5,470
3729	31	2851	71	2891	124	3317	309	2816	1,083	3334	5,496
3721	36	3566	72	2085	127	2082	309	2815	1,105	3241	5,613
2111	37	3585	72	3273	135	3361	309	3229	1,119	2818	5,799
				2052	140	2899	333	3339	1,150	2911	10,495

* Scores rounded to whole numbers. The industry names which these codes represent may be found in Appendix A, Table A-1. The industries are listed in numerical order by SIC code.

TABLE 6-15. RANKED DATA FOR THE AMOUNT OF FUEL OIL USED PER AVERAGE-SIZED ESTABLISHMENT PER YEAR
(in 1,000 barrels)*

SIC Code	Scores	SIC Code	Scores	SIC Code	Scores	SIC Code	Scores	SIC Code	Scores	SIC Code	Scores
3499	10	2099	199	3861	418	2861	1,043	3661	2,296	3334	5,716
2241	11	3361	239	3429	432	2653	1,058	3519	2,303	2073	5,782
3599	19	3461	250	3423	438	3253	1,108	3357	2,371	2061	6,228
3544	20	2042	258	2899	444	3317	1,121	2046	2,377	2082	6,470
2711	27	2851	260	3531	446	2023	1,131	2871	2,381	2262	6,557
2752	31	3079	266	2131	450	2841	1,151	3323	2,409	3391	6,874
2751	40	3679	271	2052	465	2211	1,262	2092	2,461	3275	7,079
3451	58	3621	273	2813	480	3069	1,285	3229	2,584	2096	7,504
2411	63	3362	284	2021	484	2641	1,320	3742	2,672	3711	7,771
3231	79	3585	287	3255	501	2256	1,345	2951	2,734	2661	8,417
3479	100	3433	290	2015	519	3315	1,396	3562	3,116	2833	9,919
2872	114	3541	306	2432	519	3341	1,426	2032	3,205	3351	10,331
2033	121	3566	316	3714	524	3251	1,440	3011	3,208	2815	11,223
2421	126	2071	317	3729	552	3296	1,468	3352	3,265	3221	11,829
3481	142	2051	318	3452	554	2037	1,476	3721	3,280	2111	11,993
3642	145	3273	324	3494	577	2834	1,501	2231	3,314	3241	13,253
3471	149	3548	324	3624	595	2094	1,518	3274	3,457	2812	14,274
2296	160	3561	329	2083	720	2221	1,615	2952	3,518	2816	15,298
2086	161	2121	329	3662	735	3332	1,768	2085	3,526	2911	16,620
3369	166	3559	338	2491	750	3316	1,772	2892	3,649	2824	18,917
2499	174	2013	357	3431	817	3313	1,791	2819	3,846	3021	23,519
3522	175	2022	372	3259	840	3731	1,859	3722	4,739	3511	36,162
3272	185	2026	380	3356	854	2269	2,025	2821	4,797	2621	46,949
3399	193	3321	387	3291	877	3322	2,064	2261	4,980	3331	49,215
2732	198	2011	391	3411	909	3339	2,088	2823	5,217	2631	58,980
3271	199	2831	397	2822	929	2891	2,290	2818	5,493	3312	93,795

* Scores rounded to whole numbers. The industry names which these codes represent may be found in Appendix A, Table A-1. The industries are listed in numerical order by SIC code.

TABLE 6-16. RANKED DATA FOR THE AMOUNT OF FUEL OIL USED PER EMPLOYEE PER YEAR
(in 1,000 barrels)*

SIC Code	Scores	SIC Code	Scores	SIC Code	Scores	SIC Code	Scores	SIC Code	Scores	SIC Code	Scores
2241	<1	2751	2	3479	5	2026	8	2411	14	2861	32
2296	<1	3566	2	3731	5	3423	8	3271	15	2812	32
3499	<1	3321	2	3519	5	3253	8	2083	15	3341	33
2711	<1	3548	2	3356	5	3362	8	2899	18	2819	34
3621	<1	3461	3	2131	5	3471	8	2022	19	2821	44
3721	1	3541	3	3255	5	2013	9	2073	19	3391	45
3544	1	3624	3	2051	5	3316	9	2256	20	3021	52
3599	1	2732	3	3313	5	2892	10	2082	20	2952	55
2752	1	2822	3	2221	5	3323	10	2085	20	2096	57
2033	1	3481	3	3334	6	3069	10	2032	20	3312	57
3585	2	2823	3	2872	6	3272	11	3273	20	3274	58
3522	2	2052	3	3722	6	3229	11	3221	21	2262	59
3661	2	3433	3	2011	6	2296	11	2491	23	2094	65
3531	2	3494	4	3317	6	2042	11	2813	23	2061	65
3679	2	3711	4	3011	6	3357	11	2871	24	2815	66
3729	2	2086	4	3742	6	3352	11	2231	24	2661	67
3451	2	3429	4	3562	6	3291	11	2023	24	2911	68
3369	2	3411	4	3322	6	2653	11	3251	25	2891	79
3662	2	2432	4	2851	6	3315	12	2841	25	3241	80
3714	2	2015	5	2099	6	3332	12	3511	26	3275	82
3231	2	2111	5	2831	6	3259	12	2818	28	2621	118
2211	2	3361	5	2421	7	2834	12	2021	30	2816	118
3861	2	3079	5	3431	7	2824	13	2261	30	3331	135
2121	2	3559	5	3399	7	2037	13	2092	31	2833	148
3642	2	3452	5	2046	7	2641	14	2269	31	2951	195
3561	2	2071	5	2499	7	3339	14	3351	32	2631	249

* Scores rounded to whole numbers. The industry names which these codes represent may be found in Appendix A, Table A-1. The industries are listed in numerical order by SIC code.

CHAPTER 7. PUBLIC SERVICES

Much of the Coastal Zone of Delaware lies south of the industrialized parts of the State. Hence, many of the areas that are potential industrial sites are in rural areas where public services are not well established. Industries that utilize public services will pose problems to many of the southern parts of the State. If public services are not available, alternative means of disposing of solid waste, sewage, and obtaining water must be found. Water can easily be obtained from groundwater sources and solid waste can be hauled to county dumps. The largest problem associated with the lack of public services is sewage disposal. Most large plants that have major liquid effluents that contain environmentally damaging material will usually operate their own treatment plant. However, several industry groups have historically relied on public sewers. And there are firms and establishments that have simply used the most expedient means possible for disposing of such effluent.

To identify those industries that have a high dependency on public services, two main operating variables and one measure of solid waste generation were collected. The operating variables are the amount of discharge into public utility sewers per year and the amount of fresh water intake from public utility systems per year. The mean volume of discharge into sewers is 2,089 gallons per year per employee. The standard deviation for this data set is 6,235 gallons per year per employee. By assuming a two-standard deviation above the mean cut-off, there are three industries that have an average annual discharge of more than 14,559 gallons per employee. These industries are listed in Table 7-1. The total listing of discharge into public sewers is given in Table 7-4.

TABLE 7-1. INDUSTRIES WITH WATER DISCHARGED INTO PUBLIC UTILITY SEWER PER EMPLOYEE MORE THAN TWO STANDARD DEVIATIONS ABOVE THE MEAN

SIC	Industry	Gallons
2097	Manufactured ice	20,000
2083	Malt	24,666
2812	Alkalies and chlorine	26,368

The second operating characteristic is water intake from public utility systems. The mean intake per employee is 5.8 thousand gallons per year per employee. The data has a standard deviation of 16.6 gallons. Only seven industries intake more than 39.0 gallons per year per employee. These industries are listed in Table 7-2. A complete list of water intake from public sources is found in Table 7-5.

The final measure of public service dependency is the amount of solid waste generated by the industry. Solid waste is composed of numerous types of materials, but its disposal is usually accomplished by turning it over to public sources. The total volume of waste generated by various industries is given in Table 7-6. Those that have exceptionally high volumes of waste are listed in Table 7-3. Four solid-wastes variables were used to derive this table. They were wood, paper, nonbulky

TABLE 7-2. INDUSTRIES WITH FRESH WATER FROM PUBLIC UTILITY MORE THAN TWO STANDARD DEVIATIONS ABOVE THE MEAN

SIC	Industry	Thousands of Gallons
2819	Inorganic chemicals, not elsewhere classified	42
2649	Other paperboard	43
2818	Organic chemicals, not elsewhere classified	66
2611	Pulp mills	85
3312	Blast furnaces, steel works	96
2647	Sanitary paper	119
2911	Petroleum refining	179

TABLE 7-3. INDUSTRIES WHICH GENERATE HIGH VOLUMES OF SOLID WASTE

SIC	Industry	Score
2421	Sawmills and planing mills	8
2821	Plastic materials and synthetic resins	8
3341	Secondary nonferrous metals	8
2441	Wooden boxes	7
2499	Wood products, not elsewhere classified	7
2511	Wood household furniture	7
2653	Corrugated fiber boxes	7
2893	Printing ink	7
2833	Medicinal chemicals	6(a)
2426	Hardwood dimension mills	4(a)

(a) These industries did not have large volumes of solid waste in all solid-waste categories, but extraordinarily high volumes in one category.

TABLE 7-4. RANKED DATA FOR WATER DISCHARGED INTO PUBLIC UTILITY
SEWERS PER EMPLOYEE PER YEAR (gallons)*

SIC Code	Scores	SIC Code	Scores	SIC Code	Scores	SIC Code	Scores	SIC Code	Scores	SIC Code	Scores
2823	94	3561	474	3623	714	2816	1,075	3079	1,870	2035	3,230
2824	110	3221	476	3599	725	3299	1,111	2295	1,875	3296	3,301
2643	158	3553	476	2221	735	2253	1,111	2815	1,880	2013	3,333
3573	163	3586	476	3423	736	3432	1,111	2833	1,896	3479	3,333
3021	188	2031	487	3323	739	3356	1,111	2641	1,913	2952	3,461
3533	212	3574	500	3566	746	3621	1,134	3321	1,914	3334	3,474
3931	227	2654	503	3643	750	3639	1,142	3999	1,940	2099	3,600
2647	238	3715	512	2111	751	3231	1,157	3261	1,944	3536	3,623
3264	250	3441	515	3692	757	3421	1,166	3624	2,000	2015	3,679
3731	276	3293	519	3631	760	3552	1,200	3491	2,000	2631	3,699
2861	277	3562	531	3861	763	3211	1,206	2992	2,000	2022	3,863
2611	285	3241	534	3295	769	3629	1,206	2087	2,000	2661	3,871
3651	290	3532	534	3493	769	3481	1,212	3691	2,022	2026	4,019
3581	303	2649	540	3499	769	3544	1,212	3362	2,058	2011	4,206
2871	312	3541	544	3498	769	3281	1,219	2043	2,121	2899	4,210
3611	318	2911	551	3914	769	3273	1,250	2256	2,148	2093	4,285
3275	327	3229	557	3352	779	2241	1,276	3291	2,160	2818	4,454
3811	354	3548	558	2062	810	3433	1,285	2095	2,166	2851	4,600
3542	357	3961	571	2281	813	3632	1,295	2299	2,173	2032	4,729
3941	357	3425	588	3821	836	2834	1,334	3031	2,222	2024	4,772
3831	365	3292	597	3494	848	3642	1,346	2061	2,241	3361	5,251
3672	370	3442	597	3674	862	3312	1,352	2841	2,251	3399	5,405
2297	370	2051	597	3522	869	3429	1,388	2034	2,264	3111	5,433
3537	377	3729	597	2251	875	2071	1,397	3316	2,314	2269	5,692
3722	381	3612	600	3585	887	3519	1,473	3431	2,318	2082	6,108
2052	384	3572	613	3622	898	2651	1,481	2821	2,325	2096	6,116
2296	389	3559	628	2252	952	2231	1,500	2284	2,328	2843	6,296
2432	402	3443	641	3711	967	2291	1,538	2042	2,363	2646	6,486
2522	409	3274	645	3652	975	3391	1,548	3315	2,426	2085	6,560
3545	416	3641	648	3714	994	3634	1,557	3297	2,500	2094	6,578
3671	430	3822	653	3694	1,010	3842	1,584	3317	2,500	2819	6,719
2511	431	3871	656	3644	1,011	2063	1,619	2262	2,538	2092	7,058
3339	434	3613	660	2254	1,015	2041	1,621	3569	2,608	2023	7,222
3531	441	2499	666	3369	1,025	3341	1,666	2272	2,690	3471	8,000
3851	442	3011	670	3673	1,030	3331	1,770	2621	2,922	2021	9,310
3141	444	3551	689	2831	1,034	2086	1,774	3333	3,013	2891	10,000
2211	448	2036	697	2283	1,034	3964	1,794	2084	3,043	2298	10,000
2844	454	3461	702	3444	1,041	3497	1,818	2033	3,045	2046	10,875
2842	454	3411	704	3633	1,044	2822	1,826	2261	3,120	2813	11,250
3313	459	3679	709	3069	1,062	2282	1,860	2037	3,146	2097	20,000
3511	463	3255	714	3322	1,068	3357	1,863	3351	3,194	2083	24,666
										2812	26,368

*Scores reduced to whole numbers. The industry names which these codes represent may be found in Appendix A, Table A-1. The industries in this table are listed in numerical order of SIC code.

TABLE 7-5. RANKED DATA FOR FRESH WATER FROM PUBLIC UTILITY
SYSTEMS PER EMPLOYEE PER YEAR (1000 gallons)*

SIC Code	Scores	SIC Code	Scores	SIC Code	Scores	SIC Code	Scores	SIC Code	Scores	SIC Code	Scores
2842	1	2021	1	2823	2	3861	3	3391	5	3011	10
3673	1	3552	1	3642	2	2061	3	2899	5	3722	10
3671	1	2443	1	2432	2	3692	3	3471	5	3461	10
3369	1	3573	1	2661	2	3612	3	2046	5	2032	10
2251	1	3643	1	3691	2	3694	3	3229	5	2812	12
2499	1	2083	1	3511	2	2833	3	3334	5	2099	12
3629	1	2952	1	3613	2	2269	3	3519	5	3321	12
2041	1	3842	1	3317	2	3315	3	2086	5	3069	12
3639	1	2511	1	3651	2	3323	3	3632	6	3351	13
3822	1	2094	1	2071	2	3494	3	3331	6	2813	15
3566	1	2042	1	2063	2	3634	3	3621	6	2815	16
3559	1	2253	1	3562	2	2256	4	2221	6	2033	17
2022	1	2254	1	2646	2	2841	4	3674	6	2026	19
3433	1	2843	1	3541	2	2231	4	3333	6	2015	20
3572	1	2023	1	3536	2	3211	4	2272	6	2821	20
2031	1	2281	1	2035	2	2062	4	3361	6	2892	20
3275	1	3291	1	3622	2	3731	4	3522	6	2011	22
3611	1	2891	1	3599	2	2096	4	2816	6	3711	27
2034	1	3399	1	3296	2	2262	4	2834	7	2082	30
2085	1	2024	1	3624	2	3356	4	2824	7	3714	34
2043	1	2051	2	3821	2	2651	4	3111	7	2819	42
3641	1	2095	2	3316	2	3221	4	3429	7	2649	43
3644	1	2284	2	3633	3	3352	4	2037	8	2818	66
3411	1	3672	2	2111	3	2851	4	2211	9	2611	85
3999	1	3431	2	3531	3	3585	5	2822	9	3312	96
3231	1	3561	2	3292	3	3679	5	3079	9	2647	119
3281	1	3443	2	2092	3	2261	5	3729	9	2911	179
2295	1	3322	2	3241	3	2013	5	3357	10		

*Scores less than 1 omitted, others rounded to whole number. The industry names which these codes represent may be found in Appendix A, Table A-1. The industries in this table are listed in numerical order of SIC codes.

TABLE 7-6. TOTAL VOLUME OF SOLID WASTES GENERATED BY
VARIOUS INDUSTRIES (Pounds per Employee)

Industry	Wood	Paper	Nonbulky Ferrous Metal	Other	Total
Meat packing	408	1,120	184	0	1,712
Poultry processing	211	1,090	0	11,200	12,501
Cheese, natural and processed	77	1,000	0	1,796	2,873
Ice cream	34	0	1,560	27,800	29,394
Canned and preserved fruits, vegetables	1,107	3,810	1,850	14,900	21,667
Prepared feed for animals	9,600	3,494	125	4,252	17,471
Wet corn milling	0	0	0	0	0
Beet sugar	0	0	0	0	0
Malt liquor	89	1,712	1,792	0	3,593
Distilled and blended liquors	0	49	0	310	359
Animal and marine fats and oils (rendering)	686	15,400	718	12,920	29,724
Broad-woven man-made fiber	0	91	20	572	684
Cotton finishers	0	275	59	3,400	3,734
Carpets and rugs	57	68	0	0	125
Millinery	0	5,760	0	1,494	7,254
Sawmills and planing mills	85,600	5,520	183	968	92,271
Millwork	11,720	2,124	2,356	11,340	27,540
Prefabricated wooden bldgs. and structures	4,760	11,280	60	408	16,509
Wirebound boxes and crates	3,334	11,595	0	0	14,929
Cooperage	18,660	0	0	0	18,660
Wood products, nec.*	54,680	1,378	1,894	4,380	62,332
Upholstered wool household furniture	12,780	618	682	1,846	15,926
Mattresses and bedsprings	4,760	20,040	433	1,930	27,163
Wood office furniture	7,380	97	2,170	15,620	25,267
Public building furniture	14,080	948	1,220	1,084	17,332
Metal partitions and shelving	111	1,490	11,580	6,500	19,681
Other furniture and fixtures	128	376	83	2,350	2,937
Paper mills	24,880	8,880	866	0	34,626
Paper coating and glazing	724	2,380	193	27,800	31,097
Folding paperboard boxes	456	9,780	126	12,480	22,842
Corrugated fiber boxes	313	160,705	64	2,470	163,552

TABLE 7-6. (CONTINUED)

Industry	Wood	Paper	Nonbulky Ferrous		Total
			Metal	Other	
Fiber cans, tubes, drums	2,072	6,220	3,772	895	12,959
Newspaper publishing and printing	613	3,040	204	703	4,561
Books	3,950	16,400	214	1,706	22,270
Lithographic printing	912	5,960	181	6,010	13,063
Dyes cyclic crudes	0	296	0	7,720	8,016
Organic chemicals, nec. *	0	312	378	6,546	7,236
Plastic materials and synthetic resins	62,200	2,430	2,960	106,400	173,990
Cellulosic fibers	0	0	0	4,272	4,272
Biological products	0	894	0	147	1,041
Pharmaceutical preparations	3,480	2,678	83	4,226	10,467
Paints, varnishes, enamels	0	10,520	1,086	12,360	23,966
Fertilizers	34	65	48	0	148
Agricultural pesticides	130	360	0	7,120	7,610
Printing ink	0	178	798	1,440,000	1,440,976
Miscellaneous chemicals	83	7,220	774	63,960	72,037
Paving mixtures and blocks	0	480	0	0	480
Tires and inner tubes	370	891	5	7,340	8,606
Reclaimed rubber	1,750	2,426	0	0	4,176
Leather tanning	0	79	0	16,240	16,319
Pressed and blown glass and glassware	2,670	2,812	0	2,500	7,982
Sausage and prepared meats	1,758	2,230	1,053	2,580	7,621
Creamery butter	0	4,320	0	0	4,320
Condensed and evaporated milk	0	678	3,760	1,984	6,422
Fluid milk	153	1,756	234	3,538	5,681
Grain and flour products	0	0	105	197	303
Rice milling	0	0	0	0	0
Bakery products	173	1,780	322	0	2,578
Confectionery and related products	5,710	832	496	112,800	119,838
Malt	0	0	0	0	0
Bottled soft drinks	238	1,034	174	3,504	4,950
Roasted coffee	0	397	230	0	627
Broad-woven wool fabrics	0	163	5	316	485

TABLE 7-6. (CONTINUED)

Industry	Wood	Paper	Nonbulky Ferrous Metal	Other	Total
Man-made finishers	0	0	0	4	4
Wool scouring and worsted	0	489	978	5,120	6,587
Logging camps and logging contractors	0	0	0	0	0
Hardwood dim. and flooring mills	43,300	0	0	0	43,300
Veneer and plywood	14,800	0	0	4,630	19,430
Wooden boxes	33,560	14,800	37	1,536	49,933
Veneer plywood containers	152	0	0	0	152
Wood preserving	32,900	0	0	0	32,900
Wood household furniture	5,030	744	128	464,800	470,702
Metal household furniture	459	110	1,232	404	2,205
Other household furniture	138	105	0	0	243
Metal office furniture	1,046	441	1,428	1,502	4,417
Wood partition and shelving	2,940	1,204	154	5,936	10,234
Venetian blinds and shades	816	802	2,000	1,630	5,248
Pulp mills	0	0	0	0	0
Paperboard mills	16,340	0	0	17,620	33,960
Paper products	45	9,560	117	9,680	19,403
Setup paperboard boxes	1,832	5,700	704	1,686	9,922
Sanitary food containers	0	0	0	36,100	36,100
Building paper and building paperboard	3,200	4,800	0	7,556	15,556
Periodicals	0	7,284	1,340	0	8,624
Commercial printing	494	2,440	181	16,020	19,135
Alkalies and chlorine	0	0	0	0	0
Inorganic pigments	0	84	8	607	699
Inorganic chemicals, nec.*	182	2,228	2,376	21,840	26,626
Synthetic rubber	0	0	0	762	762
Synthetic fibers	0	0	0	0	0
Medicinal chemicals	0	54,700	0	34,700	89,400
Soap and detergents	0	252	176	13,880	14,308
Gum and wood chemicals	0	0	0	0	0
Fertilizer mixing	0	420	535	642	1,597
Explosives	0	268	0	690	958

TABLE 7-6. (CONTINUED)

Industry	Wood	Paper	Nonbulky Ferrous Metal	Other	Total
Carbon black	0	0	0	0	0
Petroleum refining	0	191	2,790	2,092	5,073
Asphalt felts	0	468	40	10,620	11,128
Rubber footwear	0	37	0	338	11,504
Rubber products, nec.*	96	876	382	5,310	6,664
Flat glass	13	26	0	0	40
Glass products (purchased glass)	448	206	3,150	11,940	15,744
Cement hydraulic	79	139	9,360	60	9,639
Clay refractories	1,378	1,590	192	2,620	5,780
Concrete block, brick, and other products	640	582	370	0	1,592
Asbestos products	0	468	0	822	1,290
Mineral wool	0	0	0	80,600	80,600
Blast furnaces and steel mills	1,176	940	26,300	988	29,404
Gray-iron foundries	176	1,306	9,740	9,000	20,222
Primary copper	0	0	0	0	0
Primary zinc	0	0	0	0	0
Secondary nonferrous metals	22,100	614	77,600	1,102	101,416
Ingot casting aluminum	76	1,040	552	114	1,783
Metal cans	298	2,164	4,396	139	6,997
Fabricated structural steel	0	0	0	0	0
Plating, electroplating, polishing, etc.	50	98	1,284	55	1,488
Machinery except electrical	306	1,060	15,520	2,344	19,230
Motor vehicles and car bodies	2,120	4,240	7,160	10,300	23,820
Motor vehicle parts	118	237	400	576	13,063
Brick and structural tile	0	764	166	108,400	109,330
Ready mixed concrete, lime, and gypsum products	0	109	0	4,316	4,425
Cut stone and stone products	814	262	0	14,700	15,776
Minerals and earths ground	0	226	544,000	5,040	549,266
Nonclay refractories	0	838	3,260	4,400	8,498
Electrometallurgical products	0	0	38,140	0	38,140
Steel foundries	0	2,398	14,080	18,100	34,578

TABLE 7-6. (CONTINUED)

Industry	Wood	Paper	Nonbulky	Other	Total
			Ferrous Metal		
Primary lead	0	0	0	0	0
Primary aluminum	0	0	0	0	0
Rolling, drawing, extruding aluminum	0	51	0	264	315
Brass, bronze, copper, casting	152	38	523	618	1,331
Heating and plumbing fixtures	0	622	1,930	9,480	12,032
Metal stamping	402	4,550	5,720	2,502	13,174
Other metal fabricated products	1,616	2,870	17,220	4,764	26,470
Electrical machinery equipment and supplies	338	738	709	815	2,600
Truck and bus bodies	2,120	4,240	7,160	10,300	23,820

* nec means not elsewhere classified.

ferrous, and other solid waste. The "other" category includes pollutants such as organic, nonferrous metal, rubber, and plastics. An industry was given a score of four on an individual variable if its amount of waste was more than two-standard deviations above the mean for that variable, a three between one- and two-standard deviations above the mean, a score of two between the mean and one-standard deviation, and a score of one was given for any amount up to the mean value. The total scores the industry received on the four variables appear on Table 7-3. The scores each industry received on each of these four solid waste variables are listed in Appendix C.

Certain companies or establishments will provide their own water and sewage-treatment facilities. It is a highly variable condition and the decision is based on availability of suitable public services and the demand the company has for the services. In essence, it becomes a question as to which is more economical to the firm, purchasing the service or providing the service itself. Some general guidelines have been developed to help Delaware decision makers evaluate the normal dependency structure of industry groups. At the two-digit SIC level, the percentage of establishments with water treatment and sewage treatment facilities has been computed. These figures were arrived at by finding the percentage of treated water and effluent that is processed by firms. This percentage was assumed to be applicable to the largest establishments because of economies of scale. For example, if 20 percent of the establishments have treatment facilities, the largest 20 percent is assumed to be the ones which provide the service themselves. Exceptions to this rule can easily be found, but these data presented in Table 7-7 should provide useful guidelines for anticipating whether a firm will need public provision of their services. Data for this analysis came from the 1967 Census of Manufacturers, Special Subject Reports and Industry Statistics.

TABLE 7-7. SIZE OF ESTABLISHMENTS LIKELY TO PROVIDE INTERNAL WATER AND SEWAGE TREATMENT

SIC	Size to Provide Internal Facilities, employees	
	Water	Sewage
20 Food and kindred products	74	50
21 Tobacco manufacturers	250	175
22 Textile products	175	250
23 Apparel	No Data	No Data
24 Lumber and wood products	35	20
25 Furniture	No Data	No Data
26 Paper	75	175
27 Printing	No Data	No Data
28 Chemicals	375	200
29 Petroleum	500	10
30 Rubber	75	200
31 Leather and leather products	375	75
32 Stone, clay, and glass	35	40
33 Primary metals	2,500	1,000
34 Fabricated metal	200	175
35 Nonelectrical machinery	175	100
36 Electrical equipment	175	75
37 Transportation equipment	375	500
38 Instruments and related products	20	50
39 Misc. manufacturing	50	75

CHAPTER 8. SUMMARY OF HEAVY INDUSTRY IDENTIFICATION

The objectives of this research project were (1) to identify those industries that might be classified as heavy and, thus, not be allowed to locate in the Coastal Zone of Delaware; and (2) to identify those industries that are feasible candidates for locating in the Zone. These two objectives are achieved utilizing statistical analysis of industry characteristics. The results are based on the best available data and are objective. Each source of data has been documented; the formal procedures used to analyze the data help eliminate any ambiguous interpretations of these data. This summary section of the report integrates the various elements that have been presented in the previous sections.

The first section of the report presents the results of the analysis to define possible industries for Delaware's Coastal Zone. In order to accomplish this task, a series of industry characteristics were identified to describe the operations of industries. The characteristics were selected in a manner that would discriminate between industries possible for a Coastal Zone location and those that are not as possible. The reason for identifying possible industries is to determine which industries require location in the Coastal Zone as opposed to other parts of the State. It is a fact that many parts of the Coastal Zone are within the commuting shed of urbanized parts of the State. Therefore, a firm that locates in the Wilmington or Dover area can provide job opportunities to residents in the Coastal Zone. If a firm could locate equally well outside the Coastal Zone, it should be encouraged to do so.

Priority consideration should be given to the possible industries. If firms within these industry groups desire a location in the Coastal Zone, they should be given the opportunity if they meet the State's development goals and do not violate any environmental requirements. On the other hand, if an industry desires a location in the Coastal Zone but has not been identified by the analysis, the industrial developers within Delaware may desire to suggest alternative sites within the State. There is a definite opportunity cost associated with allowing inappropriate industries to absorb the scarce land of the Coastal Zone. The top industries have been listed in Table 2-1.

Industry's compatibility with environmental objectives must be considered. In order to evaluate the potential environmental impact, ten parameters describing the potential pollution impact of industry groups were selected. These pollution parameters have been collected and computed on the basis of pollution per employee. Several reasons existed for collecting data in such a format. First, the size of firms desiring a Coastal Zone location cannot be determined with any certainty. Thus, by recording data on a "per employee" basis, the absolute emissions, which are dependent on employment size, can be ignored. The second reason for using pollution per employee is to examine the benefits versus the environmental costs. The data show the amount of pollution that must be absorbed in order to provide gainful employment for one person. There must be a policy decision made concerning how much, if any, pollution will be tolerated to give a resident a job.

In order to derive an approximation of heavy industry, arbitrary limits on the ten pollution parameters were set. The data for each parameter were arrayed in increasing order of magnitude and then partitioned into five categories. Whenever possible, these data were partitioned according to statistical procedures. Subjective limits were utilized for the remaining parameters. Weights were assigned to each category. They were:

- 4 - very high pollution potential
- 3 - high pollution potential
- 2 - above average pollution potential
- 1 - average pollution potential
- 0 - below average pollution potential.

Each industry was placed into a category depending on its pollution potential. Each parameter, i. e., BOD, suspended solids, particulates, was assigned equal weight. The weights corresponding to the categories were summed for all ten parameters for each industry. An industry was designated as being heavy if:

- (1) The industry had very high pollution potential for at least one pollution parameter,

or

- (2) The industry had any combination of pollution potentials that totaled six or more.

The justification for the first definition of a heavy industry is easily understood. Those industries that have a particularly harmful environmental potential for one parameter should be excluded. The second definition was designed to identify those industries that have some pollution potential for a number of parameters. Since ten parameters are being used, a value of six can be obtained in a number of ways. At minimum, average emissions must exist for more than half of the parameters. Industries meeting these criteria are presented in Table 3-1. In terms of physical-chemical pollution, ten parameters of air and water pollution have been collected and analyzed. Environmental degradation also is a function of other forms of pollution such as noise and esthetics. It may also be a function of environmental risks associated with hazardous materials and radiation. The environmental-impact evaluation system will provide a means for determining the impact of these other types of pollution. In many cases, the impacts on esthetics and noise will be completely dependent upon the individual firm's mode of operation and production function. Little a priori information is available to evaluate industry groups on these factors.

It is recommended that only the air and water pollution potential be used initially to define heavy industries. Further analyses of individual applicants for the

Coastal Zone should consider the other aspects of environmental degradation. This can most easily be accomplished using an environmental-impact assessment methodology.

Besides the air and water pollution potential of industries, a series of operating characteristics have been selected that describe critical conditions for the industry groups. These characteristics include the following:

- Land area per employer
- Land area per establishment
- Multipliers
- Total water intake per employee
- Energy demand (electricity, fuel oil, gas)
- Demand on public services (public sewer discharge).

It is not clear how these factors should be considered in the analysis of heavy industries. The Coastal Zone Act does not explicitly mention these as factors that should be used unequivocally to restrict the location of an industry. They are, however, important considerations for evaluating the desirability of industries.

As presented in previous sections of this report, the data for each variable was rank ordered and the mean and standard deviation computed. Those industries that had operating characteristics that fell more than two-standard deviations above the mean were singled out as being extraordinarily high. The positive two-standard-deviation limit is used so that statistically one is able to assert that 97 percent of the industries fall below this level.

Unlike pollution potential where there is a definite combination effect from several pollution parameters, these other characteristics are basically unrelated. There does not appear to be any combination impact associated with being slightly above the average for more than one of these variables. Thus, the industries identified from these characteristics as being heavy are those that are exceptionally high for any one variable.

One exception to this last decision exists. The multipliers or linkages to industries that are heavy air and water polluters are not sufficiently important by themselves to keep industries from locating in the Coastal Zone. The linkages simply tell how much input or output from polluting industries goes to other industries. Although linkages can be used to predict industry location and complex development, they actually measure the flow of materials and goods. Distance of these flows is not taken into account. Industries linked to one another could easily locate many miles from each other. Thus, an industry linked to a polluting industry could locate in the Coastal Zone but draw its materials or provide its product to industries located in Philadelphia, Dover, Wilmington, or other parts of the Northeast industrial complex. Thus, the multipliers should be used as a warning device

that polluting industries might be attracted. Coastal Zone laws can force an industry to locate elsewhere, however.

For the land-labor ratios, energy demand, water demand, and public service demand those industries that possess high values can be considered undesirable and be kept out of Delaware's Coastal Zone. As with the pollution parameters, it is felt that data calculated on a per employee basis is the appropriate form of the variables to use. This form measures the trade-off between employing one individual and the increased pressure on land, energy, water, or public services. Land area per establishment was also used to measure absolute demand on land. The variables used to measure these demands are suggested to be:

- Land area per employee
- Land area per establishment
- Electricity, gas, and fuel oil per employee
- Water intake per employee
- Water discharged in public sewers per employee.

It is felt that these seven variables adequately represent the types of demand that are placed on natural and public resources in the Coastal Zone.

The industries that exceed the two-standard-deviation limit for these seven variables are found in Tables 4-1 and 4-2 (land-labor ratios), Table 6-1 (fuel oil per employee), Table 6-5 (purchased electrical energy per employee), Table 6-3 (gas used per employee), Table 6-8 (water intake per employee), and Table 7-1 (water discharged into public sewers). Combining these high scoring industries with the high polluters gives us the final list of heavy industries. The entire list appears in Table 8-1. These are the industries that are identified as heavy industries.

This list, however, is only the summary recommendation. In no way should this be considered final or binding. The State of Delaware should carefully review its own objectives and goals for the Coastal Zone to insure satisfactory compliance with the intent of the Act. The data and methodology used have yielded one definition of heavy industries. Changes in the assumptions used could significantly alter the results. It is strongly urged that a complete review and evaluation of the recommended definition be made.

TABLE 8-1. HEAVY INDUSTRIES

SIC	Industry	High Possible Pollution	Land Area per Employee	Land Area per Establishment	Energy Demand*	Water Demand**	Public Services***
2011	Meat packing	X					
2013	Sausage and prepared meats	X					
2015	Poultry processing	X					
2022	Cheese, natural and processed	X					
2026	Fluid milk	X					
2044	Rice milling	X					
2061	Sugarcane minus refining		X	X		X	
2062	Sugarcane refining			X			
2083	Malt				X		X
2084	Wines, brandy, and brandy spirits		X				
2085	Distilled and blended liquors	X					
2097	Manufactured ice						X
2211	Broad woven cotton fabric		X	X			
2411	Logging camps and contractors	X					
2421	Sawmills and planing mills	X					
2429	Special product sawmills, nec.	X					
2611	Pulp mills	X				X	
2631	Paperboard mills					X	
2812	Alkalies and chlorine	X			X	X	X
2813	Industrial gases	X			X	X	
2815	Dyes and cyclic crudes	X					
2816	Inorganic pigments				X		
2818	Organic chemicals, nec.				X	X	
2819	Inorganic chemicals, nec.	X			X		
2822	Synthetic rubber				X		
2833	Medicinal chemicals				X		
2861	Gum and wood chemicals	X					
2871	Fertilizers					X	
2872	Fertilizer mixing		X				
2879	Agricultural pesticides	X	X				
2891	Adhesives and gelatin				X		
2892	Explosives	X		X			

TABLE 8-1. (CONTINUED)

SIC	Industry	High Possible Pollution	Land Area per Employee	Land Area per Establishment	Energy Demand*	Water Demand**	Public Services***
2895	Carbon black	X			X		
2911	Petroleum refining	X		X	X	X	
2951	Paving mixtures and blocks				X		
3111	Leather tanning	X					
3221	Glass containers			X			
3231	Products of purchased glass		X				
3241	Hydraulic cement				X		
3271	Concrete block and brick	X	X				
3272	Concrete products, except block and brick	X					
3274	Lime				X		
3275	Gypsum products				X		
3295	Minerals and earths	X	X			X	
3312	Blast furnaces and steel mills	X					
3313	Electrometallurgical products				X	X	
3331	Primary copper	X		X			
3332	Primary lead	X					
3333	Primary zinc	X		X	X		
3334	Primary aluminum			X	X		
3339	Primary nonferrous, nec.				X	X	
3499	Fabricated metal products		X				
3511	Steam engines and turbines			X			
3531	Construction machinery		X	X			
3721	Aircraft			X			

* Included in Energy Demand is a high consumption of electricity, gas, or fuel oil per employee per year.

** Included in Water Demand is a high amount of water intake per employee per year.

*** Included in Public Services is a high amount of water discharged into public services per employee per year.

APPENDIX AA

UTILITY AND MINING DATA

APPENDIX AA

UTILITY AND MINING DATA

The main part of the text deals with defining the characteristics of manufacturing industries and using these characteristics to determine a possible definition of heavy industries. Selected non-manufacturing industries were also considered as possible candidates for locations in the Coastal Zone. In particular, utilities and mining activities are possible industries. Therefore, this appendix describes the characteristics of mining and utility companies. The data used in this analysis are not from the same sources as the data for manufacturing industries so they are not strictly comparable. However, the data cover the same operating characteristics.

TABLE 1. AIR POLLUTION

	Gas Utilities	Electric Utilities	Mining
Carbon Monoxide	768 lbs/emp/year	-	-
Hydrocarbons	246 lbs/emp/year	-	-
Nitrogen Oxides	7,990 lbs/emp/year	22,100 lbs/emp/year	-
Particulate Matter	-	34,860 lbs/emp/year	Significant
Sulfur Oxides	23,500 lbs/emp/year	94,400 lbs/emp/year	-

TABLE 2. WATER POLLUTION

Type of Electric Generation	Type of Water Pollution
Oil Powered Generators	High dissolved salts High BOD
Steam Powered	Inorganic Solids Dissolved Solids
Coal (processing for power generation)	Suspended solids Low pH High H_2SO_4 High $FeSO_4$
Nuclear	Heat
Mining	BOD .1928 lb/\$output/year COD .091 lbs/\$output/year Suspended Solids .928 lbs./ \$output/year

TABLE 3. NUMBER OF EMPLOYEES,
ESTABLISHMENTS, AVERAGE
ESTABLISHMENT SIZE

Industry	No. of Emp.	No. of Est.	Avg. Est. Size
All Mining industries (1967)	567,300	28,579	19.9
Metal Mining	70,900	1,155	61.4
Anthracite Mining	7,200	403	17.9
Bitn. Coal & Lignite Mining	124,400	4,081	30.5
Oil & Gas Extraction	244,900	16,358	15.0
Non-metallic minerals ex. fuels	119,900	6,582	18.2

Source: Census of Mining Industry

Electric, Gas & Sanitary Services (1970)	695,000	5,800	12.0
Electric Companies & Systems	289,000		
Gas Companies & Systems	164,000		
Combination Co. & Systems	189,000		
Water, Sanitary Systems	54,000		

Source: U. S. Bureau of Labor Statistics, Employment & Earnings

TABLE 4. ENERGY AND WATER USAGE

Variable	Electric Utilities	All Mining Industry	Metal Mining	Anthracite Mining	Bit. Coal & Lignite Mining	Oil & Gas Extraction	Non-Met. Minerals Exc. Fuels
Fuel Oil used per emp. per year (1000 barrels)	289,000 emp 1.2 (1970)	567,300 emp 0.03 (1967)	70,700 emp 0.04	7,200 emp 0.02	124,400 emp 0.02	244,900 emp 0.03	119,000 emp 0.06
Fuel Oil used per est. per year (1000 barrels)	2,405 est 139.7 (1969)	28,579 0.67	1,155 2.8	403 0.4	4081 0.7	16,358 0.4	6,582 1.0
Gas Used per emp. per year (mill. cu. ft.)	289,000 emp 13.6 (1970)	600,000 0.6	0.7	0	0.01	0.7	1.1
Gas Used per est. per year (mill. cu. ft.)	2,405 est 1450.3 (1969)	12.4	40.2	0	0.4	10.6	20.0
Elec. used per emp. per year (mill. kwhr.)	289,000 emp 4.4 (1970)						
Elect. used per est. per year (mill. kwhr.)	2,405 est 495.6 (1969)						
Water intake per emp. per year (1000 gallons)		2483.2 (1967)	7038.1	1388.9	201.0	1592.5	4028.4
Water intake per est. per year (1000 gallons)		49,267.0 (1967)	432,034.6	24,813.9	6,125.9	23,841.5	73,382.0

Sources - Census of Mineral Industries, 1967
 Statistics of Privately Owned and Publicly Owned Electric Utilities
 in the United States

TABLE 5. PUBLIC SERVICES INDUSTRY

Item	All Mining Industries	Metal Mining	Anthracite Mining	Bit. Coal & Lignite Mining	Oil & Gas Extraction	Non-Met.Mineral Ex. Fuels	Utilities
Water Discharged per employee per year per est. per year (1000 gallons)	2406.1 47,762.3	7052.2 432,900.4	1388.9 24,813.9	482.3 14,702.2	1498.6 22,435.5	3569.6 65,025.8	
Fresh Water intake per employee per year per est. per year (1000 gallons)	2483.2 49,267.0	7038.1 432,034.6	1388.9 24,813.9	201.0 6,125.9	1592.5 23,841.5	4028.4 73,382.0	

Sources: Census of Mineral Industries, 1967

TABLE 6. MINING AND UTILITIES INDUSTRIES LINKS
WITH HIGH POLLUTION POTENTIAL INDUSTRIES

Links with Meat Products 14.01 (SIC 201)

<u>Sector</u>	<u>Sic</u>	<u>Industry</u>
68.01	491,pt. 493	Electric Utilities

Links with Fluid Milk Industry 14.06 (SIC 2026)

<u>Sector</u>	<u>Sic</u>	<u>Industry</u>
68.01	491,pt.493	Electric Utilities
68.02	492,pt.493	Gas Utilities

Links with Alcoholic Beverage Industries 14.21 (SIC 2082-5)

<u>Sector</u>	<u>Sic</u>	<u>Industry</u>
7.00	11,12	Coal Mining
68.01	491,pt.493	Electric Utilities
68.02	492,pt.493	Gas Utilities

Links with General Sawmills and Planing Mills
20.02 (SIC 2421)

<u>Sector</u>	<u>Sic</u>	<u>Industry</u>
7.00	11,12	Coal Mining
68.01	491,pt.493	Electric Utilities

Links with Pulpmills 24.01 (SIC 2611)

<u>Sector</u>	<u>Sic</u>	<u>Industry</u>
68.03	pt.493,494-7	Water and Sanitary Services

Links with Industrial Inorganic and Organic
Chemicals Industries 2701 (SIC 281)

<u>Sector</u>	<u>Sic</u>	<u>Industry</u>
6.01	102	Copper Ore Mining
6.02	103-5,108-9	Nonferrous Metal /ores exc. Copper
8.00	1311,1321	Crude Petroleum, Natural Gas
68.01	491,pt.493	Electric Utilities
68.03	pt.493,494-7	Water and Sanitary Service

Table 6. (Continued)

Sector 27.01 SIC 281 (Continued)

<u>Sector</u>	<u>Sic</u>	<u>Industry</u>
5.00	1011, 106	Iron & Ferroalloy Ores Mining
6.01	102	Copper Ore Mining
6.02	103-5, 108-9	Nonferrous Metal Ores ex. Copper
7.00	11, 12	Coal Mining
8.00	1311, 1321	Crude Petroleum & Natural Gas
9.00	141-2, 144-5, 148-9	Stone & Clay Mining & Quarrying
10.00	147	Chemical & Fertilizer Mineral Mining
68.01	491, pt. 493	Electric Utilities
68.02	492, pt. 493	Gas Utilities
68.03	pt. 493, 494-7	Water & Sanitary Service

Links with Miscellaneous Chemical Products Industries 27.04 (SIC 2861 & 289)

<u>Sector</u>	<u>Sic</u>	<u>Industry</u>
5.00	1011, 106	Iron & Ferroalloy Mining
7.00	11, 12	Coal Mining
8.00	1311, 1321	Crude Petroleum & Natural Gas
9.00	141-2, 144-5 148-9	Stone & Clay Mining & Quarrying
10.00	147	Chemical & Fertilizer Mineral Mining
68.01	491, pt. 493	Electric Utilities
68.02	492, pt. 493	Gas Utilities

Links with Petroleum Refining 31.01 (SIC 2911)

<u>Sector</u>	<u>Sic</u>	<u>Industry</u>
5.00	1011, 106	Iron & Ferroalloy Ores Mining
7.00	11, 12	Coal Mining
8.00	1311, 1321	Crude Petroleum & Natural Gas
9.00	141-2, 148-9 144-5	Stone & Clay Mining & Quarrying
68.01	491, pt. 493	Electric Utilities
68.02	492, pt. 493	Gas Utilities
68.03	pt. 493, 494.7	Water & Sanitary Service

Links with Concrete Block and Brick Industries 36.10 (SIC 3271)

<u>Sector</u>	<u>Sic</u>	<u>Industry</u>
9.00	141-2, 144-5 148-9	Stone & Clay Mining & Quarrying

Table 6. (Continued)

Links to the Ground or Treated Minerals
Industries 36.10 (SIC 3271)

<u>Sector</u>	<u>Sic</u>	<u>Industry</u>
9.00	141-2, 144-5 148.9	Stone & Clay Mining & Quarrying
10.00	147	Chemical & Fertilizer Mineral Mining

Links to the Blast Furnace and Basic Steel
Products Industries 37.01 (SIC 331)

<u>Sector</u>	<u>Sic</u>	<u>Industry</u>
5.00	1011, 106	Iron & Ferroalloy Ores Mining
6.01	102	Copper Ore Mining
7.00	11, 12	Coal Mining
8.00	1311, 1321	Crude Petroleum & Natural Gas
9.00	141-2, 144-5 148-9	Stone & Clay Mining & Quarrying
10.00	147	Chemical & Fertilizer Mineral Mining
68.01	491,pt.493	Electric Utilities
68.02	492,pt.493	Gas Utilities
68.03	pt.493,494.7	Water & Sanitary Service

APPENDIX A

COMPLETE LISTS OF SCREENINGS
DISCUSSED IN CHAPTER 2

TABLE A-1. WATER-ORIENTED SCREENING; DELAWARE COASTAL ZONE

BATTELLE SCREENING MATRIX

CRITERIA USED

- 1 FORWARD LINKAGE TO WATER TRANSPORTATION
- 2 BACKWARD LINKAGE TO WATER TRANSPORTATION
- 3 WATER INTAKE PER EMPLOYEE PER YEAR
- 4 WATER USED FOR COOLING AND CONDENSING PER EMPLOYEE
- 5 WATER USED FOR BOILER FEED, SANITARY SERVICE AND OTHER PER EMPLOYEE

2011	MEAT PACKING	2.00	0.00	3.00	3.00	3.00	11.00
2013	SAUSAGES	2.00	0.00	3.00	1.00	3.00	9.00
2015	POULTRY	2.00	0.00	3.00	1.00	3.00	9.00
2021	CREAMERY BUTTER	2.00	2.00	5.00	5.00	5.00	19.00
2022	CHEESE	0.00	2.00	3.00	0.00	3.00	8.00
2023	CONDENSED MILK	2.00	2.00	5.00	5.00	3.00	17.00
2024	ICE CREAM	2.00	2.00	3.00	0.00	3.00	10.00
2026	FLUID MILK	2.00	0.00	3.00	3.00	3.00	11.00
2031	CANNED FISH	2.00	2.00	3.00	3.00	1.00	11.00
2032	CANNED SPECIALTIES	2.00	2.00	3.00	3.00	3.00	13.00
2033	CANNED FRUITS VEGETABLES JAM	0.00	2.00	3.00	3.00	3.00	11.00
2034	DRIED FRUITS	0.00	2.00	3.00	1.00	3.00	9.00
2035	PICKLED FRUITS VEGETABLES	2.00	2.00	3.00	1.00	3.00	11.00
2036	FRESH OR FROZEN FISH	2.00	2.00	3.00	3.00	1.00	11.00
2037	FROZEN FRUITS JUICES	0.00	2.00	5.00	0.00	3.00	10.00
2041	FLOUR AND GRAIN PRODUCTS	6.00	2.00	3.00	1.00	3.00	15.00
2042	PREPARED FEEDS FOR ANIMAL	0.00	0.00	3.00	0.00	3.00	6.00
2043	CEREAL PREPARATIONS	6.00	2.00	3.00	3.00	3.00	17.00
2044	RICE MILLING	0.00	2.00	1.00	1.00	1.00	5.00
2045	PREPARED FLOUR	6.00	2.00	1.00	1.00	1.00	11.00
2046	WET CORN MILLING	6.00	0.00	5.00	10.00	3.00	24.00
2051	BREAD AND BAKERY PRODUCTS	2.00	2.00	1.00	1.00	1.00	7.00
2052	COOKIES AND CRACKERS	2.00	2.00	3.00	1.00	1.00	9.00
2061	CANE SUGAR MINUS REFINING	8.00	2.00	5.00	10.00	5.00	30.00
2062	CANE SUGAR REFINING	8.00	2.00	5.00	10.00	3.00	28.00
2063	BEET SUGAR	8.00	2.00	5.00	5.00	3.00	23.00
2071	CANDY PRODUCTS	6.00	2.00	3.00	0.00	3.00	14.00
2072	CHOCOLATE PRODUCTS	6.00	2.00	1.00	1.00	1.00	11.00
2073	CHEWING GUM	6.00	2.00	1.00	1.00	1.00	11.00
2082	MALT LIQUORS	2.00	2.00	5.00	0.00	3.00	12.00
2083	MALT	2.00	2.00	5.00	0.00	3.00	12.00
2084	WINES AND BRANDY	2.00	2.00	5.00	0.00	3.00	12.00
2085	DISTILLED BLENDED LIQUORS	2.00	2.00	5.00	5.00	3.00	17.00
2086	BOTTLED CANNED SOFT DRINKS	0.00	2.00	3.00	1.00	3.00	9.00
2087	FLAVORING EXTRACTS SYRUPS	0.00	2.00	3.00	0.00	3.00	8.00
2091	COTTONSEED OIL MILLS	2.00	0.00	1.00	1.00	1.00	5.00
2092	SOYBEAN OIL MILLS	0.00	0.00	5.00	10.00	3.00	18.00
2093	OTHER VEGETABLE OIL MILLS	10.00	0.00	5.00	10.00	3.00	28.00
2094	ANIMAL FATS OILS	8.00	0.00	5.00	5.00	3.00	21.00
2095	ROASTED COFFEE	10.00	2.00	3.00	3.00	3.00	21.00
2096	SHORTENING AND MARGARINE	2.00	2.00	5.00	5.00	3.00	17.00
2097	MANUFACTURED ICE	2.00	0.00	5.00	10.00	3.00	20.00
2098	MACARONI SPAGHETTI NOODLES	0.00	2.00	1.00	1.00	1.00	5.00
2099	FOOD PREPARATIONS	0.00	2.00	5.00	0.00	3.00	10.00
2111	CIGARETTES	2.00	0.00	3.00	1.00	1.00	7.00
2121	CIGARS	2.00	0.00	1.00	1.00	1.00	5.00
2131	TOBACCO AND SNUFF	2.00	0.00	1.00	1.00	1.00	5.00

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TABLE A-1. (continued)

2141	TOBACCO STEMMING REFRIG	2.00	0.00	1.00	1.00	1.00	5.00
2211	BROAD WOVEN COTTON FABRIC	2.00	0.00	3.00	1.00	1.00	7.00
2221	BROAD WOVEN MANMADE FIBER	2.00	0.00	3.00	1.00	1.00	7.00
2231	BROAD WOVEN WOOL FABRICS	2.00	0.00	3.00	1.00	3.00	9.00
2241	NARROW FABRICS	0.00	0.00	3.00	1.00	1.00	5.00
2251	WOMENS HOSIERY	2.00	0.00	3.00	1.00	1.00	7.00
2252	OTHER HOSIERY	2.00	0.00	3.00	1.00	1.00	7.00
2253	KNIT OUTERWARE MILLS	2.00	0.00	3.00	1.00	1.00	7.00
2254	KNIT UNDERWARE MILLS	2.00	0.00	3.00	1.00	1.00	7.00
2256	KNIT FABRIC MILLS	2.00	0.00	3.00	1.00	1.00	7.00
2259	OTHER KNITTING MILLS	2.00	0.00	1.00	1.00	1.00	5.00
2261	COTTON FINISHERS	2.00	0.00	5.00	1.00	3.00	11.00
2262	MANMADE FIBER SILK FINISHERS	2.00	0.00	5.00	1.00	3.00	11.00
2269	OTHER TEXTILE FINISHERS	0.00	0.00	3.00	1.00	3.00	7.00
2271	WOVEN CARPETS AND RUGS	0.00	2.00	1.00	1.00	1.00	5.00
2272	TUFTED CARPETS AND RUGS	0.00	2.00	3.00	1.00	3.00	9.00
2279	OTHER CARPETS AND RUGS	0.00	2.00	1.00	1.00	1.00	5.00
2281	YARN SPINNING MILLS	0.00	0.00	3.00	1.00	1.00	5.00
2282	YARN THROWING TWISTING MILLS	0.00	0.00	3.00	1.00	1.00	5.00
2283	WOOL YARN MILLS	0.00	0.00	3.00	1.00	3.00	7.00
2284	THREAD MILLS	2.00	0.00	3.00	1.00	1.00	7.00
2291	FELT GOODS MINUS WOVEN FELTS	0.00	0.00	3.00	1.00	3.00	7.00
2292	LACE GOODS	0.00	0.00	1.00	1.00	1.00	3.00
2293	PADDINGS UPHOLSTERY FILLINGS	6.00	0.00	1.00	1.00	1.00	9.00
2294	PROCESSED WASTE	10.00	0.00	1.00	1.00	1.00	13.00
2295	ARTIFICIAL LEATHER OILCLOTH	2.00	0.00	3.00	0.00	3.00	8.00
2296	TIRE CORD AND FABRIC	2.00	0.00	1.00	1.00	3.00	7.00
2297	WOOL SCOURING AND WORTED	8.00	0.00	3.00	1.00	3.00	15.00
2298	CORDAGE AND TWINE	10.00	0.00	5.00	1.00	1.00	17.00
2299	OTHER TEXTILE GOODS	10.00	0.00	3.00	0.00	3.00	16.00
2311	MENS BOYS SUITS AND COATS	2.00	0.00	1.00	1.00	1.00	5.00
2321	MENS BOYS SHIRTS AND COLLARS	2.00	0.00	1.00	1.00	1.00	5.00
2322	MENS BOYS UNDERWEAR	2.00	0.00	1.00	1.00	1.00	5.00
2323	MENS BOYS NECKWEAR	2.00	0.00	1.00	1.00	1.00	5.00
2327	MENS BOYS SEPARATE TROUSERS	2.00	0.00	1.00	1.00	1.00	5.00
2328	MENS BOYS WORK CLOTHING	2.00	0.00	1.00	1.00	1.00	5.00
2329	OTHER MENS BOYS CLOTHING	2.00	0.00	1.00	1.00	1.00	5.00
2331	WOMENS MISSES BLOUSES SHIRTS	2.00	0.00	1.00	1.00	1.00	5.00
2335	WOMENS MISSES DRESSES	2.00	0.00	1.00	1.00	1.00	5.00
2337	WOMENS MISSES SKIRTS COATS	2.00	0.00	1.00	1.00	1.00	5.00
2339	OTHER WOMEN MISSES OUTERWARE	2.00	0.00	1.00	1.00	1.00	5.00
2341	WOMENS UNDERWARE NIGHTWEAR	2.00	0.00	1.00	1.00	1.00	5.00
2342	CORSETS	2.00	0.00	1.00	1.00	1.00	5.00
2351	MILLINERY	2.00	0.00	1.00	1.00	1.00	5.00
2352	HATS AND CAPS	2.00	0.00	1.00	1.00	1.00	5.00
2361	CHILDRENS DRESSES BLOUSES	2.00	0.00	1.00	1.00	1.00	5.00
2363	CHILDRENS COATS SUITS	2.00	0.00	1.00	1.00	1.00	5.00
2369	OTHER CHILDRENS OUTERWARE	2.00	0.00	1.00	1.00	1.00	5.00
2371	FUR GOODS	2.00	0.00	1.00	1.00	1.00	5.00
2381	DRESS AND WORK GLOVES	2.00	0.00	1.00	1.00	1.00	5.00
2384	ROBES AND DRESSING GOWNS	2.00	0.00	1.00	1.00	1.00	5.00
2385	RAINCOATS	2.00	0.00	1.00	1.00	1.00	5.00
2386	LEATHER CLOTHING	2.00	0.00	1.00	1.00	1.00	5.00
2387	APPAREL BELTS	2.00	0.00	1.00	1.00	1.00	5.00
2389	OTHER APPAREL + ACCESSORIES	2.00	0.00	1.00	1.00	1.00	5.00
2391	CURTAINS AND DRAPERIES	2.00	0.00	1.00	1.00	1.00	5.00

TABLE A-1. (continued)

2392	OTHER HOUSE FURNISHINGS	2.00	0.00	1.00	1.00	1.00	5.00
2393	TEXTILE BAGS	2.00	0.00	1.00	1.00	1.00	5.00
2394	CANVAS	2.00	0.00	1.00	1.00	1.00	5.00
2395	PLACING + NOVELTY STITCHING	2.00	0.00	1.00	1.00	1.00	5.00
2396	AUTOMOTIVE TRIMMINGS	2.00	0.00	1.00	1.00	1.00	5.00
2397	SCHIFFLI EMBROIDERIES	2.00	0.00	1.00	1.00	1.00	5.00
2399	OTHER FABRICATED TEXTILES	2.00	0.00	1.00	1.00	1.00	5.00
2411	LOGGING CAMPS CONTRACTORS	0.00	0.00	1.00	1.00	1.00	3.00
2421	SAWMILLS PLANING MILLS	6.00	0.00	1.00	1.00	1.00	9.00
2426	HARDWOOD DIMENSION MILLS	8.00	0.00	1.00	1.00	1.00	11.00
2429	SPECIAL PRODUCT SAWMILLS	10.00	0.00	1.00	1.00	1.00	13.00
2431	MILLWORK	0.00	0.00	1.00	1.00	1.00	3.00
2432	VENEER AND PLYWOOD	8.00	0.00	5.00	1.00	3.00	17.00
2433	PREFAB WOODEN BLOCS	0.00	0.00	1.00	1.00	1.00	3.00
2441	WOODEN BOXES	0.00	0.00	1.00	1.00	1.00	3.00
2442	WIREBOUND BOXES CRATES	0.00	0.00	1.00	1.00	1.00	3.00
2443	VENEER PLYWOOD CONTAINERS	0.00	0.00	1.00	1.00	1.00	3.00
2445	COOPERAGE	0.00	0.00	1.00	1.00	1.00	3.00
2491	WOOD PRESERVING	0.00	0.00	3.00	0.00	3.00	6.00
2499	WOOD PRODUCTS	8.00	0.00	5.00	1.00	3.00	17.00
2511	WOOD HOUSEHOLD FURNITURE	0.00	0.00	1.00	1.00	3.00	5.00
2512	UPHOLSTERED WOOD HSHLD FURN	2.00	0.00	1.00	1.00	1.00	5.00
2514	METAL HOUSEHOLD FURNITURE	2.00	0.00	1.00	1.00	1.00	5.00
2515	MATTRESSES AND BEDSPRINGS	2.00	0.00	1.00	1.00	1.00	5.00
2519	OTHER HOUSEHOLD FURNITURE	0.00	0.00	1.00	1.00	1.00	3.00
2521	WOOD OFFICE FURNITURE	2.00	0.00	1.00	1.00	1.00	5.00
2522	METAL OFFICE FURNITURE	2.00	0.00	1.00	1.00	1.00	5.00
2531	PUBLIC BLDG FURNITURE	2.00	0.00	1.00	1.00	1.00	5.00
2541	WOOD PARTITIONS + SHELVING	2.00	0.00	1.00	1.00	1.00	5.00
2542	METAL PARTITIONS + SHELVING	2.00	0.00	1.00	1.00	1.00	5.00
2591	VENETIAN BLINDS + SHADES	2.00	0.00	1.00	1.00	1.00	5.00
2599	OTHER FURNITURE + FIXTURES	2.00	0.00	1.00	1.00	1.00	5.00
2611	PULP MILLS	8.00	0.00	5.00	5.00	10.00	28.00
2621	PAPER MILLS	6.00	0.00	5.00	0.00	3.00	14.00
2631	PAPERBOARD MILLS	0.00	0.00	5.00	5.00	5.00	15.00
2641	PAPER COATING AND GLAZING	2.00	0.00	3.00	3.00	1.00	9.00
2642	ENVELOPES	2.00	2.00	1.00	1.00	1.00	7.00
2643	BAGS MINUS TEXTILE BAGS	2.00	0.00	3.00	0.00	1.00	6.00
2644	WALLPAPER	0.00	0.00	1.00	1.00	1.00	3.00
2645	DIE CUT PAPER + CARDBOARD	2.00	0.00	1.00	1.00	1.00	5.00
2646	PRESSED MOLDED PULP GOODS	2.00	0.00	5.00	1.00	3.00	11.00
2647	SANITARY PAPER	2.00	0.00	3.00	1.00	1.00	7.00
2649	OTHER PAPERBOARD	2.00	0.00	3.00	1.00	1.00	7.00
2651	FOLDING PAPERBOARD BOXES	2.00	0.00	3.00	3.00	3.00	11.00
2652	SET-UP PAPERBOARD BOXES	2.00	0.00	1.00	1.00	1.00	5.00
2653	CORRUGATED FIBER BOXES	2.00	0.00	1.00	1.00	1.00	5.00
2654	SANITARY FOOD CONTAINERS	2.00	0.00	3.00	1.00	1.00	7.00
2655	FIBER CANS TUBS DRUMS	2.00	0.00	1.00	1.00	1.00	5.00
2661	BUILDING PAPER	0.00	0.00	5.00	0.00	3.00	8.00
2711	NEWSPAPER PUBLISHING + PRINT	2.00	0.00	1.00	1.00	1.00	5.00
2721	PERIODICAL PUBLISHING + PRINT	2.00	2.00	1.00	1.00	1.00	7.00
2731	BOOKS PUBLISHING + PRINTING	2.00	2.00	1.00	1.00	1.00	7.00
2732	BOOK PRINTING	2.00	2.00	1.00	1.00	1.00	7.00
2741	OTHER PUBLISHING	2.00	0.00	1.00	1.00	1.00	5.00
2751	COMMERCIAL PRINTING	2.00	0.00	1.00	1.00	1.00	5.00
2752	LITHOGRAPHIC PRINTING	2.00	0.00	1.00	1.00	1.00	5.00

TABLE A-1. (continued)

2753	ENGRAVING	2.00	0.00	1.00	1.00	1.00	5.00
2761	MANIFOLD BUSINESS FORMS	2.00	0.00	1.00	1.00	1.00	5.00
2771	GPSETTING CARDS	2.00	0.00	1.00	1.00	1.00	5.00
2782	BLANKBOOKS+LOOSE LEAF BINDER	2.00	0.00	1.00	1.00	1.00	5.00
2791	TYPESETTING	2.00	0.00	1.00	1.00	1.00	5.00
2793	PHOTOENGRAVING	2.00	0.00	1.00	1.00	1.00	5.00
2794	ELECTROTYPING STEROTYPING	2.00	0.00	1.00	1.00	1.00	5.00
2812	ALKALIES AND CHLORINE	0.00	0.00	5.00	10.00	3.00	18.00
2813	INDUSTRIAL GASES	0.00	0.00	5.00	10.00	3.00	18.00
2815	DYES CYCLIC CRUDES	0.00	0.00	5.00	10.00	3.00	18.00
2816	INORGANIC PIGMENTS	0.00	0.00	5.00	10.00	5.00	20.00
2818	ORGANIC CHEMICALS NEC	0.00	0.00	5.00	10.00	5.00	20.00
2819	INORGANIC CHEMICALS NEC	0.00	0.00	5.00	10.00	5.00	20.00
2821	PLASTICS MATERIALS + RESINS	0.00	0.00	5.00	10.00	3.00	18.00
2822	SYNTHETIC RUBBER	0.00	0.00	5.00	10.00	5.00	20.00
2823	CELLULOSE MAN-MADE FIBERS	0.00	0.00	5.00	10.00	3.00	18.00
2824	SYNTHETIC ORGANIC FIBERS	0.00	0.00	5.00	5.00	3.00	13.00
2831	BIOLOGICAL PRODUCTS	2.00	0.00	3.00	1.00	3.00	9.00
2833	MEDICINAL CHEMICALS	2.00	0.00	5.00	10.00	3.00	20.00
2834	PHARMACEUTICAL PREPARATIONS	2.00	0.00	3.00	0.00	3.00	8.00
2841	SOAP AND DETERGENTS	0.00	0.00	5.00	0.00	3.00	8.00
2842	SPECIALTY CLEANING PRODUCTS	0.00	0.00	3.00	1.00	1.00	5.00
2843	SURFACE ACTIVE AGENTS	0.00	0.00	5.00	10.00	5.00	20.00
2844	PERFUMES COSMETICS	2.00	0.00	1.00	1.00	1.00	5.00
2851	PAINTS VARNISHES ENAMELS	0.00	0.00	3.00	0.00	3.00	6.00
2861	GUM AND WOOD CHEMICALS	0.00	2.00	5.00	10.00	5.00	22.00
2871	FERTILIZERS	8.00	0.00	5.00	10.00	10.00	33.00
2872	FERTILIZER MIXING	8.00	0.00	1.00	1.00	1.00	11.00
2879	AGRICULTURAL PESTICIDES	0.00	0.00	1.00	1.00	1.00	3.00
2891	ADHESIVES AND GELATIN	0.00	2.00	5.00	5.00	3.00	15.00
2892	EXPLOSIVES	0.00	2.00	5.00	10.00	3.00	20.00
2893	PRINTING INK	0.00	2.00	1.00	1.00	1.00	5.00
2895	CARBON BLACK	0.00	2.00	1.00	1.00	1.00	5.00
2899	OTHER CHEMICALS	0.00	2.00	5.00	5.00	3.00	15.00
2911	PETROLEUM REFINING	8.00	10.00	5.00	10.00	10.00	43.00
2951	PAVING MIXTURES AND BLOCKS	6.00	0.00	5.00	1.00	1.00	13.00
2952	ASPHALT FELTS AND COATINGS	6.00	0.00	5.00	0.00	3.00	14.00
2992	LUBRICATING OILS + GREASES	8.00	0.00	3.00	1.00	3.00	15.00
2999	PETROLEUM COAL PRODUCTS NEC	8.00	0.00	5.00	1.00	1.00	15.00
3011	TIRES AND INNER TUBES	0.00	2.00	3.00	0.00	3.00	8.00
3021	RUBBER FOOTWEAR	0.00	0.00	3.00	1.00	1.00	5.00
3031	RECLAIMED RUBBER	0.00	2.00	5.00	5.00	1.00	13.00
3069	RUBBER PRODUCTS NEC	0.00	2.00	3.00	0.00	3.00	8.00
3079	MISC PLASTICS PRODUCTS	2.00	0.00	3.00	0.00	3.00	8.00
3111	LEATHER TANNING	0.00	0.00	3.00	1.00	1.00	5.00
3121	LEATHER BELTING AND PACKING	0.00	0.00	1.00	1.00	1.00	3.00
3131	FOOTWEAR CUTSTOCK	0.00	0.00	1.00	1.00	1.00	3.00
3141	SHOES MINUS RUBBER	2.00	0.00	1.00	1.00	1.00	5.00
3142	HOUSE SLIPPERS	2.00	0.00	1.00	1.00	1.00	5.00
3151	LEATHER GLOVES MITTENS	2.00	0.00	1.00	1.00	1.00	5.00
3161	LUGGAGE	2.00	0.00	1.00	1.00	1.00	5.00
3171	WOMENS HANDBAGS	2.00	0.00	1.00	1.00	1.00	5.00
3172	OTHER PERSONAL LEATHER GOODS	2.00	0.00	1.00	1.00	1.00	5.00
3199	LEATHER GOODS NEC	2.00	0.00	1.00	1.00	1.00	5.00
3211	FLAT GLASS	0.00	0.00	3.00	0.00	3.00	6.00
3221	GLASS CONTAINERS	0.00	0.00	3.00	3.00	1.00	7.00

TABLE A-1. (continued)

3229	PRESSED AND BLOWN GLASS	0.00	0.00	3.00	1.00	1.00	5.00
3231	PRODUCTS OF PURCHASED GLASS	0.00	0.00	3.00	1.00	3.00	7.00
3241	HYDRAULIC CEMENT	6.00	0.00	5.00	5.00	3.00	19.00
3251	BRICK + STRUCTURAL CLAY TILE	0.00	0.00	1.00	1.00	1.00	3.00
3253	CERAMIC WALL AND FLOOR TILE	8.00	0.00	1.00	1.00	1.00	11.00
3255	CLAY REFRACTORIES	0.00	0.00	3.00	3.00	3.00	9.00
3259	STRUCTURAL CLAY PRODUCTS NEC	2.00	0.00	1.00	1.00	1.00	5.00
3261	VITREOUS PLUMBING FIXTURES	2.00	0.00	3.00	1.00	3.00	9.00
3262	VITREOUS TABLE ARTICLES	2.00	0.00	1.00	1.00	1.00	5.00
3263	EARTHENWARE TABLE ARTICLES	2.00	0.00	1.00	1.00	1.00	5.00
3264	PORCELAIN ELECTRIC SUPPLIES	2.00	0.00	1.00	1.00	1.00	5.00
3269	POTTERY PRODUCTS NEC	2.00	0.00	1.00	1.00	1.00	5.00
3271	CONCRETE BLOCK AND BRICK	0.00	0.00	1.00	1.00	1.00	3.00
3272	OTHER CONCRETE PRODUCTS	0.00	0.00	1.00	1.00	1.00	3.00
3273	READY-MIXED CONCRETE	0.00	0.00	5.00	1.00	1.00	7.00
3274	LIME	8.00	0.00	5.00	0.00	5.00	18.00
3275	GYP SUM PRODUCTS	2.00	0.00	3.00	1.00	3.00	9.00
3281	CUT STONE	6.00	0.00	5.00	1.00	1.00	13.00
3291	ABRASIVE PRODUCTS	0.00	0.00	3.00	3.00	1.00	7.00
3292	ASBESTOS PRODUCTS	0.00	0.00	3.00	3.00	1.00	7.00
3293	GASKETS PACKING	2.00	0.00	3.00	1.00	1.00	7.00
3295	MINERALS GROUND OR TREATED	2.00	0.00	5.00	0.00	3.00	10.00
3296	MINERAL WOOD	2.00	0.00	3.00	3.00	3.00	11.00
3297	NONCLAY REFRACTORIES	0.00	0.00	5.00	3.00	1.00	9.00
3299	NONMETALLIC PRODUCTS NEC	6.00	0.00	3.00	3.00	3.00	15.00
3312	BLAST FURNACES STEEL WORKS	6.00	0.00	5.00	10.00	3.00	24.00
3313	ELECTROMETALLURGICAL PRODUCT	6.00	0.00	5.00	10.00	10.00	31.00
3315	STEEL WIRE DRAWING AND NAILS	6.00	0.00	3.00	3.00	3.00	15.00
3316	COLD ROLLED STEEL SHEET+BARS	6.00	0.00	3.00	0.00	3.00	12.00
3317	STEEL PIPE AND TUBES	6.00	0.00	3.00	3.00	3.00	15.00
3321	GRAY IRON FOUNDRIES	2.00	0.00	3.00	0.00	3.00	8.00
3322	MALLEABLE IRON FOUNDRIES	2.00	0.00	3.00	0.00	3.00	8.00
3323	STEEL FOUNDRIES	2.00	0.00	3.00	1.00	1.00	7.00
3331	PRIMARY COPPER PRODUCTION	0.00	0.00	5.00	10.00	3.00	18.00
3332	PRIMARY LEAD PRODUCTION	0.00	0.00	5.00	0.00	3.00	8.00
3333	PRIMARY ZINC PRODUCTION	0.00	0.00	5.00	5.00	3.00	13.00
3334	PRIMARY ALUMINUM PRODUCTION	0.00	0.00	5.00	5.00	1.00	11.00
3339	PRIMARY NONFERROUS PROD NEC	6.00	0.00	5.00	0.00	3.00	14.00
3341	SECONDARY NONFERROUS METAL	2.00	0.00	3.00	3.00	3.00	11.00
3351	COPPER ROLLING + DRAWING	0.00	0.00	5.00	0.00	3.00	8.00
3352	ALUMINUM ROLLING + DRAWING	2.00	0.00	3.00	0.00	1.00	6.00
3356	ROLLING DRAWING NEC	2.00	0.00	3.00	0.00	1.00	6.00
3357	NONFERROUS WIRE DRAWING	2.00	0.00	3.00	1.00	3.00	9.00
3361	ALUMINUM CASTINGS	2.00	0.00	3.00	3.00	3.00	11.00
3362	BRASS BRONZE+COPPER CASTING	2.00	0.00	3.00	3.00	1.00	9.00
3369	NONFERROUS CASTINGS NEC	2.00	0.00	3.00	1.00	1.00	7.00
3391	IRON AND STEEL FORGINGS	2.00	0.00	3.00	1.00	3.00	9.00
3399	PRIMARY METAL PRODUCTS NEC	2.00	0.00	5.00	0.00	3.00	10.00
3411	METAL CANS	2.00	0.00	1.00	1.00	1.00	5.00
3421	CUTLERY	0.00	0.00	3.00	0.00	1.00	4.00
3423	HAND EDGE TOOLS MINUS SAWS	0.00	0.00	3.00	1.00	3.00	7.00
3425	HAND SAWS AND SAW BLADES	0.00	0.00	3.00	1.00	1.00	5.00
3429	HARDWARE NEC	2.00	0.00	3.00	1.00	1.00	9.00
3431	IRON METAL SANITARY WARE	2.00	0.00	3.00	1.00	1.00	7.00
3432	BRASS PLUMBING FITTINGS	2.00	0.00	3.00	1.00	1.00	7.00
3433	NONELECTRIC HEATING EQUIP	2.00	0.00	3.00	1.00	3.00	9.00

TABLE A-1. (continued)

3441	FABRICATED STRUCTURAL STEEL	2.00	0.00	3.00	1.00	3.00	9.00
3442	METAL DOORS SASH & FRAMES	2.00	0.00	3.00	1.00	1.00	7.00
3443	FABRICATED PLATE WORK	2.00	0.00	1.00	1.00	1.00	5.00
3444	SHEET METAL WORK	2.00	0.00	3.00	1.00	1.00	7.00
3446	ARCHITECTURAL METAL WORK	2.00	0.00	1.00	1.00	1.00	5.00
3449	MISCELLANEOUS METAL WORK	2.00	0.00	1.00	1.00	1.00	5.00
3451	SCREW MACHINE PRODUCTS	0.00	0.00	1.00	1.00	1.00	3.00
3452	BOLTS NUTS SCREWS & WASHERS	0.00	0.00	1.00	1.00	1.00	3.00
3461	METAL STAMPINGS	2.00	0.00	3.00	1.00	1.00	7.00
3471	ELECTROPLATING	2.00	0.00	5.00	1.00	1.00	9.00
3479	COATING ENGRAVING ETC	2.00	0.00	3.00	3.00	1.00	9.00
3481	MISC FABRICATED WIRE PRODUCT	0.00	0.00	3.00	1.00	1.00	5.00
3491	METAL SHIPPING BARRELS+KEGS	0.00	0.00	3.00	1.00	3.00	7.00
3492	SAFES AND VAULTS	2.00	0.00	1.00	1.00	1.00	5.00
3493	STEEL SPRINGS	2.00	0.00	3.00	0.00	1.00	6.00
3494	VALVES PIPE FITTINGS	2.00	0.00	3.00	1.00	1.00	7.00
3496	COLLAPSIBLE TUBES	2.00	0.00	1.00	1.00	1.00	5.00
3497	METAL FOIL AND LEAF	2.00	0.00	3.00	0.00	1.00	6.00
3498	FABRICATED PIPES & FITTINGS	2.00	0.00	3.00	1.00	1.00	7.00
3499	FABRICATED METAL PRODUCT NEC	2.00	0.00	3.00	1.00	1.00	7.00
3511	STEAM ENGINES AND TURBINES	2.00	0.00	5.00	0.00	3.00	10.00
3519	INTERNAL COMBUSTION ENG NEC	2.00	0.00	3.00	1.00	1.00	7.00
3522	FARM MACHINERY AND EQUIPMENT	0.00	0.00	3.00	1.00	3.00	7.00
3531	CONSTRUCTION MACHINERY	2.00	0.00	3.00	1.00	1.00	7.00
3532	MINING MACHINERY & EQUIPMENT	2.00	0.00	1.00	1.00	1.00	5.00
3533	OIL FIELD MACHINERY & EQUIP	2.00	0.00	3.00	1.00	1.00	7.00
3534	ELEVATORS	0.00	0.00	1.00	1.00	1.00	3.00
3535	CONVEYORS	2.00	0.00	1.00	1.00	1.00	5.00
3536	HOISTS CRANES & MONORAILS	2.00	0.00	3.00	1.00	1.00	7.00
3537	INDUSTRIAL TRUCKS & TRACTORS	2.00	0.00	1.00	1.00	1.00	5.00
3541	METAL CUTTING MACHINE TOOLS	2.00	0.00	1.00	1.00	1.00	5.00
3542	METAL FORMING MACHINE TOOLS	2.00	0.00	1.00	1.00	1.00	5.00
3544	SPECIAL DIE TOOLS DYE SETS	2.00	0.00	3.00	1.00	3.00	9.00
3545	MACHINE TOOL ACCESSORIES	2.00	0.00	1.00	1.00	1.00	5.00
3548	METALWORKING MACHINERY	2.00	0.00	3.00	1.00	1.00	7.00
3551	FOOD PRODUCTS MACHINERY	2.00	0.00	1.00	1.00	1.00	5.00
3552	TEXTILE MACHINERY	0.00	0.00	3.00	1.00	3.00	7.00
3553	WOODWORKING MACHINERY	2.00	0.00	3.00	1.00	1.00	7.00
3554	PAPER INDUSTRIES MACHINERY	0.00	0.00	1.00	1.00	1.00	3.00
3555	PRINTING TRADES MACHINERY	2.00	0.00	1.00	1.00	1.00	5.00
3559	SPECIAL INDUSTRY MACH NEC	2.00	0.00	3.00	1.00	1.00	7.00
3561	PUMPS AND COMPRESSORS	2.00	0.00	1.00	1.00	1.00	5.00
3562	BALL AND ROLLER BEARINGS	2.00	0.00	3.00	1.00	1.00	7.00
3564	BLOWERS AND FANS	2.00	0.00	1.00	1.00	1.00	5.00
3565	INDUSTRIAL PATTERNS	2.00	0.00	1.00	1.00	1.00	5.00
3566	POWER TRANSMISSION EQUIPMENT	2.00	0.00	3.00	1.00	1.00	7.00
3567	INDUSTRIAL FURNACES & OVENS	2.00	0.00	1.00	1.00	1.00	5.00
3569	OTHER INDUSTRIAL MACHINERY	2.00	0.00	3.00	3.00	3.00	11.00
3572	TYPEWRITERS	0.00	0.00	1.00	1.00	1.00	3.00
3573	ELECTRONIC COMPUTING EQUIP	2.00	0.00	3.00	1.00	1.00	7.00
3574	CALCULATING & ACCTG MACHINES	2.00	0.00	1.00	1.00	1.00	5.00
3576	SCALES AND BALANCES	2.00	0.00	1.00	1.00	1.00	5.00
3579	OTHER OFFICE MACHINES	0.00	0.00	1.00	1.00	1.00	3.00
3581	AUTOMATIC VENDING MACHINES	2.00	0.00	1.00	1.00	1.00	5.00
3582	COMMERCIAL LAUNDRY EQUIPMENT	2.00	0.00	1.00	1.00	1.00	5.00
3585	REFRIGERATION EQUIPMENT	2.00	0.00	3.00	1.00	1.00	7.00

TABLE A-1. (continued)

3586	MEASURING + DISPENSING PUMPS	2.00	0.00	1.00	1.00	1.00	5.00
3589	SERVICE INDUSTRY MACHINES NEC	2.00	0.00	1.00	1.00	1.00	5.00
3599	MISC MACHINERY MINUS ELECT	2.00	0.00	3.00	1.00	1.00	7.00
3611	ELECTRIC MEASURING EQUIPMENT	2.00	0.00	1.00	1.00	1.00	5.00
3612	POWER TRANSFORMERS	0.00	0.00	3.00	1.00	1.00	5.00
3613	SWITCHGEAR SWITCHBOARD EQPMT	2.00	0.00	3.00	1.00	1.00	7.00
3621	MOTORS AND GENERATORS	2.00	0.00	3.00	1.00	3.00	9.00
3622	INDUSTRIAL CONTROLS	2.00	0.00	3.00	1.00	1.00	7.00
3623	WELDING APPARATUS	2.00	0.00	1.00	1.00	1.00	5.00
3624	CARBON + GRAPHITE PRODUCTS	0.00	0.00	3.00	3.00	1.00	7.00
3629	ELECTRICAL IND APPARATUS NEC	2.00	0.00	3.00	3.00	1.00	9.00
3631	HOUSEHOLD COOKING EQUIPMENT	2.00	0.00	1.00	1.00	1.00	5.00
3632	HOUSEHOLD REFRIGERATORS	2.00	0.00	3.00	1.00	1.00	7.00
3633	HOUSEHOLD LAUNDRY EQUIPMENT	2.00	0.00	3.00	1.00	1.00	7.00
3634	ELECTRIC HOUSEWARES + FANS	2.00	0.00	3.00	1.00	1.00	7.00
3635	HOUSEHOLD VACUUM CLEANERS	2.00	0.00	1.00	1.00	1.00	5.00
3636	SEWING MACHINES	2.00	0.00	1.00	1.00	1.00	5.00
3639	HOUSEHOLD APPLIANCES NEC	2.00	0.00	3.00	1.00	1.00	7.00
3641	ELECTRIC LAMPS	2.00	0.00	1.00	1.00	1.00	5.00
3642	LIGHTING FIXTURES	0.00	0.00	3.00	1.00	1.00	5.00
3643	CURRENT-CARRYING WIRING EQUIP	2.00	0.00	3.00	1.00	1.00	7.00
3644	NONCURRENT-CARRYING WIRING EQ	2.00	0.00	3.00	1.00	1.00	7.00
3651	RADIO TV RECEIVING SETS	0.00	0.00	1.00	1.00	1.00	3.00
3652	PHONOGRAPH RECORDS	2.00	0.00	3.00	1.00	1.00	7.00
3661	TELEPHONE + TELEGRAPH EQUIP	2.00	0.00	1.00	1.00	1.00	5.00
3662	RADIO TV TRANSMITTING EQUIP	2.00	0.00	1.00	1.00	1.00	5.00
3671	ELECTRON TUBES RECEIVING	2.00	0.00	1.00	1.00	1.00	5.00
3672	CATHODE RAY PICTURE TUBES	2.00	0.00	3.00	1.00	1.00	7.00
3673	ELECTRON TUBES TRANSMITTING	2.00	0.00	3.00	1.00	1.00	7.00
3674	SEMICONDUCTORS	2.00	0.00	3.00	1.00	1.00	7.00
3679	ELECTRONIC COMPONENTS NEC	2.00	0.00	3.00	1.00	1.00	7.00
3691	STORAGE BATTERIES	2.00	2.00	3.00	3.00	1.00	11.00
3692	PRIMARY BATTERIES - WET + DRY	0.00	0.00	1.00	1.00	1.00	3.00
3694	ELECTRICAL EQ FOR ENGINES	0.00	2.00	3.00	1.00	1.00	7.00
3699	ELECTRICAL EQUIPMENT NEC	2.00	0.00	1.00	1.00	1.00	5.00
3711	MOTOR VEHICLES	2.00	2.00	3.00	1.00	1.00	9.00
3712	PASSENGER CAR BODIES	2.00	2.00	1.00	1.00	1.00	7.00
3713	TRUCK AND BUS BODIES	2.00	0.00	1.00	1.00	1.00	5.00
3714	MOTOR VEHICLE PARTS	2.00	2.00	3.00	1.00	3.00	11.00
3715	TRUCK TRAILERS	2.00	0.00	3.00	1.00	1.00	7.00
3721	AIRCRAFT	2.00	0.00	1.00	1.00	1.00	5.00
3722	AIRCRAFT ENGINES + PARTS	2.00	0.00	3.00	1.00	5.00	11.00
3723	AIRCRAFT PROPELLERS + PARTS	2.00	0.00	1.00	1.00	1.00	5.00
3729	AIRCRAFT PARTS + EQ NEC	2.00	0.00	3.00	1.00	1.00	7.00
3731	SHIP BUILDING AND REPAIRING	2.00	10.00	3.00	1.00	3.00	19.00
3732	BOAT BUILDING AND REPAIRING	2.00	0.00	1.00	1.00	1.00	5.00
3741	LOCOMOTIVES AND PARTS	2.00	0.00	1.00	1.00	1.00	5.00
3742	RAILROAD AND STREETCARS	2.00	0.00	1.00	1.00	1.00	5.00
3751	MOTORCYCLES BICYCLES + PARTS	6.00	0.00	1.00	1.00	1.00	9.00
3791	TRAILER COACHES	2.00	0.00	1.00	1.00	1.00	5.00
3799	TRANSPORTATION EQUIPMENT NEC	0.00	0.00	1.00	1.00	1.00	3.00
3811	LABORATORY RESEARCH EQUIPMEN	2.00	0.00	1.00	1.00	1.00	5.00
3821	MFG MEASURING DEVICES	2.00	0.00	3.00	1.00	1.00	7.00
3822	AUTOMAT TEMPERATURE CONTROLS	2.00	0.00	1.00	1.00	1.00	5.00
3831	OPTICAL INSTRUMENTS + LENSES	0.00	0.00	1.00	1.00	1.00	3.00
3841	SURGICAL + MEDICAL INSTRUMEN	2.00	0.00	1.00	1.00	1.00	5.00

TABLE A-1. (continued)

3842	SURGICAL APPLIANCES + SUPPLY	2.00	0.00	3.00	1.00	3.00	9.00
3843	DENTAL EQUIP AND SUPPLIES	2.00	0.00	1.00	1.00	1.00	5.00
3851	OPHTHALMIC GOODS	0.00	0.00	3.00	1.00	1.00	5.00
3851	PHOTOGRAPHIC EQUIP + SUPPLY	2.00	2.00	3.00	1.00	1.00	9.00
3871	WATCHES CLOCKS AND PARTS	2.00	0.00	3.00	1.00	1.00	7.00
3872	WATCHCASES	2.00	0.00	1.00	1.00	1.00	5.00
3911	JEWELRY PRECIOUS METAL	0.00	0.00	1.00	1.00	1.00	3.00
3912	JEWELERS FINDINGS + MATERIAL	0.00	0.00	1.00	1.00	1.00	3.00
3913	LAPIDARY WORK	0.00	0.00	1.00	1.00	1.00	3.00
3914	SILVERWARE + PLATED WARE	0.00	0.00	3.00	1.00	3.00	7.00
3931	MUSICAL INSTRUMENTS	0.00	0.00	1.00	1.00	1.00	3.00
3941	GAMES + TOYS MINUS DOLLS	0.00	0.00	3.00	1.00	1.00	5.00
3942	DOLLS	0.00	0.00	1.00	1.00	1.00	3.00
3943	CHILDREN'S VEHICLES	0.00	0.00	1.00	1.00	1.00	3.00
3949	SPORTING GOODS NEC	2.00	0.00	1.00	1.00	1.00	5.00
3951	PENS POINTS + MECH PENCILS	2.00	0.00	1.00	1.00	1.00	5.00
3952	PENCILS CRAYONS ARTIST MATLS	2.00	0.00	1.00	1.00	1.00	5.00
3953	MARKING DEVICES	2.00	0.00	1.00	1.00	1.00	5.00
3955	CARBON PAPER + INKED RIBBON	2.00	0.00	1.00	1.00	1.00	5.00
3961	COSTUME JEWELRY + NOVELTIES	0.00	0.00	3.00	1.00	1.00	5.00
3962	FEATHERS ARTIFICIAL FLOWERS	10.00	0.00	1.00	1.00	1.00	13.00
3963	BUTTONS	0.00	0.00	1.00	1.00	1.00	3.00
3964	NEEDLES PINS HOOKS + EYES	0.00	0.00	3.00	1.00	1.00	5.00
3991	BROOMS AND BRUSHES	0.00	0.00	1.00	1.00	1.00	3.00
3993	SIGNS + ADVERTISING DISPLAYS	2.00	0.00	1.00	1.00	1.00	5.00
3994	HORTICIANS' GOODS	2.00	0.00	1.00	1.00	1.00	5.00
3996	LINOLEUM+FLOOR COVERING NEC	0.00	0.00	1.00	1.00	1.00	3.00
3999	MANUFACTURING INDUSTRIES NEC	0.00	0.00	3.00	1.00	1.00	5.00

TABLE A-2.
BATTELLE SCREENING MATRIX
DELAWARE - UPPER REGION

CRITERIA USED

- 1 WATER INTAKE PER EMPLOYEE PER YEAR
- 2 PERCENT OF TOTAL SHIPMENTS BY RAIL
- 3 PERCENT OF TOTAL SHIPMENTS BY TRUCK (HIGHWAY)
- 4 PERCENT OF TOTAL SHIPMENTS BY WATER
- 5 PERCENT IN THE INDUSTRY COMPLETING 12 YEARS OR MORE OF SCHOOL
- 6 AVERAGE NUMBER OF EMPLOYEES PER ESTABLISHMENT

	3.00	1.00	3.00	0.00	0.00	1.00	8.00
2011 MEAT PACKING	3.00	0.00	3.00	0.00	0.00	0.00	6.00
2013 SAUSAGES	3.00	0.00	3.00	0.00	0.00	1.00	7.00
2015 POULTRY	1.00	1.00	1.00	0.00	0.00	0.00	3.00
2021 CREAMERY BUTTER	3.00	1.00	1.00	0.00	0.00	0.00	5.00
2022 CHEESE	1.00	1.00	1.00	0.00	0.00	0.00	3.00
2023 CONDENSED MILK	3.00	1.00	1.00	0.00	0.00	0.00	5.00
2024 ICE CREAM	3.00	1.00	1.00	0.00	0.00	0.00	5.00
2026 FLUID MILK	3.00	1.00	1.00	0.00	0.00	0.00	5.00
2031 CANNED FISH	3.00	1.00	1.00	0.00	0.00	0.00	5.00
2032 CANNED SPECIALTIES	3.00	1.00	1.00	0.00	0.00	3.00	8.00
2033 CANNED FRUITS VEGETABLES JAM	3.00	1.00	1.00	0.00	0.00	1.00	6.00
2034 DRIED FRUITS	3.00	1.00	1.00	0.00	0.00	1.00	6.00
2035 PICKLED FRUITS VEGETABLES	3.00	1.00	1.00	0.00	0.00	0.00	5.00
2036 FRESH OR FROZEN FISH	3.00	1.00	1.00	0.00	0.00	0.00	5.00
2037 FROZEN FRUITS JUICES	1.00	1.00	1.00	0.00	0.00	1.00	4.00
2041 FLOUR AND GRAIN PRODUCTS	3.00	3.00	0.00	0.00	0.00	0.00	6.00
2042 PREPARED FEEDS FOR ANIMAL	3.00	3.00	0.00	0.00	0.00	0.00	6.00
2043 CEREAL PREPARATIONS	3.00	3.00	0.00	0.00	0.00	5.00	11.00
2044 RICE MILLING	5.00	3.00	0.00	0.00	0.00	1.00	9.00
2045 PREPARED FLOUR	5.00	3.00	0.00	0.00	0.00	1.00	9.00
2046 WET CORN MILLING	1.00	3.00	0.00	0.00	0.00	5.00	9.00
2051 BREAD AND BAKERY PRODUCTS	5.00	3.00	0.00	0.00	0.00	1.00	9.00
2052 COOKIES AND CRACKERS	3.00	3.00	0.00	0.00	0.00	1.00	7.00
2061 CANE SUGAR MINIS REFINING	1.00	3.00	0.00	0.00	0.00	1.00	5.00
2062 CANE SUGAR REFINING	1.00	3.00	0.00	0.00	0.00	5.00	9.00
2063 BEET SUGAR	1.00	3.00	0.00	0.00	0.00	3.00	7.00
2071 CANDY PRODUCTS	3.00	0.00	3.00	0.00	0.00	1.00	7.00
2072 CHOCOLATE PRODUCTS	5.00	0.00	3.00	0.00	0.00	3.00	11.00
2073 CHEWING GUM	5.00	0.00	3.00	0.00	0.00	5.00	13.00
2082 MALT LIQUORS	1.00	1.00	1.00	0.00	0.00	5.00	8.00
2083 MALT	1.00	1.00	1.00	0.00	0.00	0.00	3.00
2084 WINES AND BRANDY	1.00	1.00	1.00	0.00	0.00	0.00	3.00
2085 DISTILLED BLENDED LIQUORS	1.00	1.00	1.00	0.00	0.00	3.00	6.00
2086 BOTTLED CANNED SOFT DRINKS	3.00	0.00	5.00	0.00	0.00	0.00	8.00
2087 FLAVORING EXTRACTS SIRUPS	3.00	0.00	5.00	0.00	0.00	0.00	8.00
2091 COTTONSEED OIL MILLS	5.00	1.00	0.00	0.00	0.00	0.00	6.00
2092 SOYBEAN OIL MILLS	1.00	1.00	0.00	0.00	0.00	1.00	3.00
2093 OTHER VEGETABLE OIL MILLS	1.00	1.00	0.00	0.00	0.00	0.00	2.00
2094 ANIMAL FATS OILS	1.00	0.00	3.00	0.00	0.00	0.00	4.00
2095 ROASTED COFFEE	3.00	1.00	0.00	0.00	0.00	1.00	5.00
2096 SHORTENING MARGARINE	1.00	1.00	0.00	0.00	0.00	1.00	3.00
2097 MANUFACTURED ICE	1.00	1.00	0.00	0.00	0.00	0.00	2.00
2098 MACARONI SPAGHETTI NOODLES	5.00	1.00	0.00	0.00	0.00	0.00	6.00
2099 FOOD PREPARATIONS	1.00	1.00	0.00	0.00	0.00	0.00	2.00

TABLE A-2.(continued)

2111	CIGARETTES	3.00	1.00	1.00	0.00	0.00	5.00	10.00
2121	CIGARS	5.00	1.00	1.00	0.00	0.00	1.00	8.00
2131	TOBACCO AND SNIFF	5.00	1.00	1.00	0.00	0.00	1.00	8.00
2141	TOBACCO STEMMING MACHINERY	5.00	1.00	1.00	0.00	0.00	1.00	8.00
2211	BROAD WOVEN COTTON FABRIC	3.00	0.00	5.00	1.00	0.00	5.00	14.00
2221	BROAD WOVEN MANMADE FIBER	3.00	0.00	5.00	1.00	0.00	5.00	14.00
2231	BROAD WOVEN WOOL FABRICS	3.00	0.00	5.00	1.00	0.00	1.00	10.00
2241	NARROW FABRICS	3.00	0.00	5.00	1.00	0.00	1.00	10.00
2251	WOMENS HOSIERY	3.00	0.00	3.00	1.00	0.00	3.00	10.00
2252	OTHER HOSIERY	3.00	0.00	3.00	1.00	0.00	1.00	8.00
2253	KNIT OUTERWEAR MILLS	3.00	0.00	3.00	1.00	0.00	1.00	8.00
2254	KNIT UNDERWEAR MILLS	3.00	0.00	3.00	1.00	0.00	5.00	12.00
2256	KNIT FABRIC MILLS	3.00	0.00	5.00	1.00	0.00	1.00	10.00
2259	OTHER KNITTING MILLS	5.00	0.00	3.00	1.00	0.00	0.00	9.00
2261	COTTON FINISHERS	1.00	0.00	5.00	1.00	0.00	3.00	10.00
2262	MANMADE FIBER SILK FINISHERS	1.00	0.00	5.00	1.00	0.00	1.00	8.00
2269	OTHER TEXTILE FINISHERS	3.00	0.00	5.00	1.00	0.00	1.00	10.00
2271	WOVEN CARPETS AND RUGS	5.00	0.00	5.00	1.00	0.00	1.00	12.00
2272	TUFTED CARPETS AND RUGS	3.00	0.00	5.00	1.00	0.00	1.00	10.00
2279	OTHER CARPETS AND RUGS	5.00	0.00	5.00	1.00	0.00	0.00	11.00
2281	YARN SPINNING MILLS	3.00	0.00	5.00	1.00	0.00	3.00	12.00
2282	YARN THROWING TWISTING MILLS	3.00	0.00	5.00	1.00	0.00	1.00	10.00
2283	WOOL YARN MILLS	3.00	0.00	5.00	1.00	0.00	1.00	10.00
2284	THREAD MILLS	3.00	0.00	5.00	1.00	0.00	3.00	12.00
2291	FELT GOODS MINUS WOVEN FELTS	3.00	0.00	5.00	1.00	0.00	1.00	10.00
2292	LACE GOODS	5.00	0.00	5.00	1.00	0.00	0.00	11.00
2293	PADUINGS UPHOLSTERY FILLINGS	5.00	0.00	5.00	1.00	0.00	0.00	11.00
2294	PROCESSED WASTE	5.00	0.00	5.00	1.00	0.00	0.00	11.00
2295	ARTIFICIAL LEATHER OILCLOTH	3.00	0.00	5.00	1.00	0.00	1.00	10.00
2296	TIRE CORE AND FABRIC	5.00	0.00	5.00	1.00	0.00	5.00	16.00
2297	WOOL SCOURING AND WORSTED	3.00	0.00	5.00	1.00	0.00	1.00	10.00
2298	CORUAGE AND TWINE	1.00	0.00	5.00	1.00	0.00	1.00	8.00
2299	OTHER TEXTILE GOODS	3.00	0.00	5.00	1.00	0.00	0.00	9.00
2311	MENS BOYS SUITS AND COATS	5.00	0.00	3.00	1.00	0.00	1.00	10.00
2321	MENS BOYS SHIRTS AND COLLARS	5.00	0.00	3.00	1.00	0.00	1.00	10.00
2322	MENS BOYS UNDERWEAR	5.00	0.00	3.00	1.00	0.00	3.00	12.00
2323	MENS BOYS NECKWEAR	5.00	0.00	3.00	1.00	0.00	0.00	9.00
2327	MENS BOYS SEPARATE TROUSERS	5.00	0.00	3.00	1.00	0.00	1.00	10.00
2328	MENS BOYS WORK CLOTHING	5.00	0.00	3.00	1.00	0.00	3.00	12.00
2329	OTHER MENS BOYS CLOTHING	5.00	0.00	3.00	1.00	0.00	1.00	10.00
2331	WOMENS MISSES BLOUSES SHIRTS	5.00	0.00	3.00	1.00	0.00	1.00	10.00
2335	WOMENS MISSES DRESSES	5.00	0.00	3.00	1.00	0.00	0.00	9.00
2337	WOMENS MISSES SKIRTS COATS	5.00	0.00	3.00	1.00	0.00	0.00	9.00
2339	OTHER WOMEN MISSES OUTERWEAR	5.00	0.00	3.00	1.00	0.00	1.00	10.00
2341	WOMENS UNDERWEAR NIGHTWEAR	5.00	0.00	3.00	1.00	0.00	1.00	10.00
2342	CORSETS	5.00	0.00	3.00	1.00	0.00	1.00	10.00
2351	MILLINERY	5.00	0.00	3.00	1.00	0.00	0.00	9.00
2352	HATS AND CAPS	5.00	0.00	3.00	1.00	0.00	0.00	9.00
2361	CHILDRENS DRESSES BLOUSES	5.00	0.00	3.00	1.00	0.00	1.00	10.00
2363	CHILDRENS COATS SUITS	5.00	0.00	3.00	1.00	0.00	0.00	9.00
2369	OTHER CHILDRENS OUTERWEAR	5.00	0.00	3.00	1.00	0.00	1.00	10.00
2371	FUR GOODS	5.00	0.00	3.00	1.00	0.00	0.00	9.00
2381	DRESS AND WORK GLOVES	5.00	0.00	3.00	1.00	0.00	1.00	10.00
2384	ROBES AND DRESSING GOWNS	5.00	0.00	3.00	1.00	0.00	0.00	9.00
2385	RAINCOATS	5.00	0.00	3.00	1.00	0.00	1.00	10.00
2386	LEATHER CLOTHING	5.00	0.00	3.00	1.00	0.00	0.00	9.00

TABLE A-2.(continued)

2387	APPAREL BELTS	5.00	0.00	3.00	1.00	0.00	0.00	9.00
2389	OTHER APPAREL & ACCESSORIES	5.00	0.00	3.00	1.00	0.00	0.00	9.00
2391	CURTAINS AND DRAFFRIES	5.00	0.00	3.00	1.00	0.00	0.00	9.00
2392	OTHER HOUSEFURNISHINGS	5.00	0.00	3.00	1.00	0.00	0.00	9.00
2393	TEXTILE BAGS	5.00	0.00	3.00	1.00	0.00	0.00	9.00
2394	CANVAS	5.00	0.00	3.00	1.00	0.00	0.00	9.00
2395	PLEATING & NOVELTY STITCHING	5.00	0.00	3.00	1.00	0.00	0.00	9.00
2396	AUTOMOTIVE TRIMMINGS	5.00	0.00	3.00	1.00	0.00	0.00	9.00
2397	SCHIFFLI EMBROIDERIES	5.00	0.00	3.00	1.00	0.00	0.00	9.00
2399	OTHER FABRICATED TEXTILES	5.00	0.00	3.00	1.00	0.00	0.00	9.00
2411	LOGGING CAMPS CONTRACTORS	5.00	1.00	1.00	0.00	0.00	0.00	7.00
2421	SAWMILLS PLANING MILLS	5.00	1.00	1.00	0.00	0.00	0.00	7.00
2426	HARDWOOD DIMENSION MILLS	5.00	1.00	1.00	0.00	0.00	0.00	7.00
2429	SPECIAL PRODUCT SAWMILLS	5.00	1.00	1.00	0.00	0.00	0.00	7.00
2431	MILLWORK	5.00	3.00	0.00	0.00	0.00	0.00	8.00
2432	VENEER AND PLYWOOD	1.00	3.00	0.00	0.00	0.00	1.00	5.00
2433	PREFAB WOODEN BLOGS	5.00	3.00	0.00	0.00	0.00	0.00	8.00
2441	WOODEN BOXES	5.00	1.00	1.00	0.00	0.00	0.00	7.00
2442	WIREBOUND BOXES CRATES	5.00	1.00	1.00	0.00	0.00	1.00	8.00
2443	VENEER PLYWOOD CONTAINERS	5.00	1.00	1.00	0.00	0.00	0.00	7.00
2445	COOPERAGE	5.00	1.00	1.00	0.00	0.00	0.00	7.00
2491	WOOD PRESERVING	3.00	1.00	1.00	0.00	0.00	0.00	5.00
2499	WOOD PRODUCTS	1.00	1.00	1.00	0.00	0.00	0.00	3.00
2511	WOOD HOUSEHOLD FURNITURE	5.00	0.00	3.00	0.00	0.00	1.00	9.00
2512	UPHOLSTERED WOOD HSHLD FURN	5.00	0.00	3.00	0.00	0.00	0.00	8.00
2514	METAL HOUSEHOLD FURNITURE	5.00	0.00	3.00	0.00	0.00	1.00	9.00
2515	MATTRESSES AND BEDSPRINGS	5.00	0.00	3.00	0.00	0.00	0.00	8.00
2519	OTHER HOUSEHOLD FURNITURE	5.00	0.00	3.00	0.00	0.00	0.00	8.00
2521	WOOD OFFICE FURNITURE	5.00	0.00	3.00	0.00	0.00	0.00	8.00
2522	METAL OFFICE FURNITURE	5.00	0.00	3.00	0.00	0.00	1.00	9.00
2531	PUBLIC BLDG FURNITURE	5.00	0.00	3.00	1.00	0.00	1.00	10.00
2541	WOOD PARTITIONS & SHELVING	5.00	0.00	3.00	1.00	0.00	0.00	9.00
2542	METAL PARTITIONS & SHELVING	5.00	0.00	3.00	1.00	0.00	0.00	9.00
2591	VENETIAN BLINDS & SHADES	5.00	0.00	3.00	1.00	0.00	0.00	9.00
2599	OTHER FURNITURE & FIXTURES	5.00	0.00	3.00	1.00	0.00	0.00	9.00
2611	PULP MILLS	1.00	3.00	0.00	0.00	1.00	3.00	8.00
2621	PAPER MILLS	1.00	3.00	0.00	0.00	1.00	5.00	10.00
2631	PAPERBOARD MILLS	1.00	3.00	0.00	0.00	1.00	3.00	8.00
2641	PAPER COATING AND GLAZING	3.00	1.00	1.00	1.00	1.00	1.00	8.00
2642	ENVELOPES	5.00	1.00	1.00	1.00	1.00	1.00	10.00
2643	BAGS MINUS TEXTILE BAGS	3.00	1.00	1.00	1.00	1.00	1.00	8.00
2644	WALLPAPER	5.00	1.00	1.00	1.00	1.00	0.00	9.00
2645	DIE CUT PAPER & CARDBOARD	5.00	1.00	1.00	1.00	1.00	0.00	9.00
2646	PRESSED MOLDED PULP GOODS	1.00	1.00	1.00	1.00	1.00	1.00	6.00
2647	SANITARY PAPER	3.00	1.00	1.00	1.00	1.00	3.00	10.00
2649	OTHER PAPERBOARD	3.00	1.00	1.00	1.00	1.00	1.00	8.00
2651	FOLDING PAPERBOARD BOXES	3.00	0.00	3.00	0.00	1.00	1.00	8.00
2652	SET-UP PAPERBOARD BOXES	5.00	0.00	3.00	0.00	1.00	0.00	9.00
2653	CORRUGATED FIBER BOXES	5.00	0.00	3.00	0.00	1.00	1.00	10.00
2654	SANITARY FOOD CONTAINERS	3.00	0.00	3.00	0.00	1.00	1.00	8.00
2655	FIBER CANS TUBS DRUMS	5.00	0.00	3.00	0.00	1.00	1.00	10.00
2661	BUILDING PAPER	1.00	3.00	0.00	0.00	1.00	1.00	6.00
2711	NEWSPAPER PUBLISHING & PRINT	5.00	1.00	1.00	0.00	3.00	0.00	10.00
2721	PERIODICAL PUBLISHING & PRINT	5.00	1.00	1.00	0.00	3.00	0.00	10.00
2731	BOOKS PUBLISHING & PRINTING	5.00	1.00	1.00	0.00	3.00	1.00	11.00
2732	BOOK PRINTING	5.00	1.00	1.00	0.00	3.00	1.00	11.00

TABLE A-2. (continued)

2741	OTHER PUBLISHING	5.00	1.00	1.00	0.00	3.00	0.00	10.00
2751	COMMERCIAL PRINTING	5.00	0.00	3.00	0.00	3.00	0.00	11.00
2752	LITHOGRAPHIC PRINTING	5.00	0.00	3.00	0.00	3.00	0.00	11.00
2753	ENGRAVING	5.00	0.00	3.00	0.00	3.00	0.00	11.00
2761	MANIFOLD BUSINESS FORMS	5.00	1.00	1.00	0.00	3.00	1.00	11.00
2771	GREETING CARDS	5.00	1.00	1.00	0.00	3.00	1.00	11.00
2782	BLANKBOOKS-LOOSE LEAF BINDERS	5.00	1.00	1.00	0.00	3.00	1.00	11.00
2791	TYPESETTING	5.00	0.00	3.00	0.00	3.00	0.00	11.00
2793	PHOTOENGRAVING	5.00	0.00	3.00	0.00	3.00	0.00	11.00
2794	ELECTROTYPING STEROTYPING	5.00	0.00	3.00	0.00	3.00	0.00	11.00
2812	ALKALIES AND CHLORINE	1.00	1.00	0.00	0.00	5.00	5.00	12.00
2813	INDUSTRIAL GASES	1.00	1.00	0.00	0.00	5.00	0.00	7.00
2815	DYES CYCLIC CRIDES	1.00	1.00	0.00	0.00	5.00	3.00	10.00
2816	INORGANIC PIGMENTS	1.00	1.00	0.00	0.00	5.00	1.00	8.00
2818	ORGANIC CHEMICALS NEC	1.00	1.00	0.00	0.00	5.00	3.00	10.00
2819	INORGANIC CHEMICALS NEC	1.00	1.00	0.00	0.00	5.00	1.00	8.00
2821	PLASTICS MATERIALS + RESINS	1.00	1.00	1.00	0.00	5.00	1.00	9.00
2822	SYNTHETIC RUBBER	1.00	1.00	1.00	0.00	5.00	5.00	13.00
2823	CELLULOSE MAN-MADE FIBERS	1.00	1.00	1.00	0.00	5.00	5.00	13.00
2824	SYNTHETIC ORGANIC FIBERS	1.00	1.00	1.00	0.00	5.00	5.00	13.00
2831	BIOLOGICAL PRODUCTS	3.00	1.00	1.00	0.00	5.00	1.00	11.00
2833	MEDICINAL CHEMICALS	1.00	1.00	1.00	0.00	5.00	1.00	9.00
2834	PHARMACEUTICAL PREPARATIONS	3.00	1.00	1.00	0.00	5.00	1.00	11.00
2841	SOAP AND DETERGENTS	1.00	0.00	3.00	0.00	5.00	0.00	9.00
2842	SPECIALTY CLEANING PRODUCTS	3.00	0.00	3.00	0.00	5.00	0.00	11.00
2843	SURFACE ACTIVE AGENTS	1.00	0.00	3.00	0.00	5.00	0.00	9.00
2844	PERFUMES COSMETICS	5.00	0.00	3.00	0.00	5.00	1.00	14.00
2851	PAINTS VARNISHES ENAMELS	3.00	0.00	3.00	0.00	5.00	0.00	11.00
2861	GUM AND WOOD CHEMICALS	1.00	1.00	1.00	0.00	5.00	0.00	8.00
2871	FERTILIZERS	1.00	1.00	1.00	0.00	5.00	1.00	9.00
2872	FERTILIZER MIXING	5.00	1.00	1.00	0.00	5.00	0.00	12.00
2879	AGRICULTURAL PESTICIDES	5.00	1.00	1.00	0.00	5.00	0.00	12.00
2891	ADHESIVES AND GELATIN	1.00	1.00	1.00	0.00	5.00	0.00	8.00
2892	EXPLOSIVES	1.00	1.00	1.00	0.00	5.00	5.00	13.00
2893	PRINTING INK	5.00	1.00	1.00	0.00	5.00	0.00	12.00
2895	CARBON BLACK	5.00	1.00	0.00	0.00	5.00	1.00	12.00
2899	OTHER CHEMICALS	1.00	1.00	1.00	0.00	5.00	0.00	8.00
2911	PETROLEUM REFINING	1.00	0.00	0.00	0.00	1.00	3.00	5.00
2951	PAVING MIXTURES AND BLOCKS	1.00	0.00	3.00	0.00	1.00	0.00	5.00
2952	ASPHALT FELTS AND COATINGS	1.00	0.00	3.00	0.00	1.00	1.00	6.00
2992	LUBRICATING OILS + GREASES	3.00	0.00	3.00	0.00	1.00	0.00	7.00
2999	PETROLEUM COAL PRODUCTS NEC	1.00	0.00	3.00	0.00	1.00	0.00	5.00
3011	TIRES AND INNER TUBES	3.00	1.00	1.00	0.00	1.00	5.00	11.00
3021	RUBBER FOOTWEAR	3.00	0.00	3.00	1.00	1.00	5.00	13.00
3031	RECLAIMED RUBBER	1.00	0.00	3.00	1.00	1.00	1.00	7.00
3069	RUBBER PRODUCTS NEC	3.00	0.00	3.00	1.00	1.00	1.00	9.00
3079	MISC PLASTICS PRODUCTS	3.00	0.00	3.00	1.00	1.00	1.00	9.00
3111	LEATHER TANNING	3.00	0.00	3.00	1.00	1.00	1.00	9.00
3121	LEATHER BELTING AND PACKING	5.00	0.00	3.00	1.00	1.00	0.00	10.00
3131	FOOTWEAR CUTSTOCK	5.00	0.00	3.00	1.00	1.00	0.00	10.00
3141	SHOES MINUS RUBBER	5.00	0.00	3.00	1.00	1.00	3.00	13.00
3142	HOUSE SLIPPERS	5.00	0.00	3.00	1.00	1.00	1.00	11.00
3151	LEATHER GLOVES MITTENS	5.00	0.00	3.00	1.00	1.00	0.00	10.00
3161	LUGGAGE	5.00	0.00	3.00	1.00	1.00	1.00	11.00
3171	WOMENS HANDRAGS	5.00	0.00	3.00	1.00	1.00	0.00	10.00
3172	OTHER PERSONAL LEATHER GOODS	5.00	0.00	3.00	1.00	1.00	0.00	10.00

TABLE A-2.(continued)

3199	LEATHER GOODS NEC	5.00	0.00	3.00	1.00	1.00	0.00	10.00
3211	FLAT GLASS	3.00	1.00	1.00	0.00	1.00	5.00	11.00
3221	GLASS CONTAINERS	3.00	0.00	3.00	0.00	1.00	5.00	12.00
3229	PRESSED AND BLOWN GLASS	3.00	0.00	3.00	0.00	1.00	3.00	10.00
3231	PRODUCTS OF PURCHASED GLASS	3.00	0.00	3.00	0.00	1.00	0.00	7.00
3241	HYDRAULIC CEMENT	1.00	1.00	1.00	0.00	1.00	3.00	7.00
3251	BRICK & STRUCTURAL CLAY TILE	5.00	1.00	1.00	0.00	1.00	1.00	9.00
3253	CERAMIC WALL AND FLOOR TILE	5.00	1.00	1.00	0.00	1.00	1.00	9.00
3255	CLAY REFRACTORIES	3.00	1.00	1.00	0.00	1.00	1.00	7.00
3259	STRUCTURAL CLAY PRODUCTS NEC	5.00	1.00	1.00	0.00	1.00	1.00	9.00
3261	VITREOUS PLUMBING FIXTURES	3.00	1.00	1.00	0.00	1.00	3.00	9.00
3262	VITREOUS TABLE ARTICLES	5.00	1.00	1.00	0.00	1.00	3.00	11.00
3263	EARTHENWARE TABLE ARTICLES	5.00	1.00	1.00	0.00	1.00	5.00	13.00
3264	PORCELAIN ELECTRIC SUPPLIES	5.00	1.00	1.00	0.00	1.00	3.00	11.00
3269	POTTERY PRODUCTS NEC	5.00	1.00	1.00	0.00	1.00	0.00	8.00
3271	CONCRETE BLOCK AND BRICK	5.00	1.00	1.00	0.00	1.00	0.00	8.00
3272	OTHER CONCRETE PRODUCTS	5.00	1.00	1.00	0.00	1.00	0.00	8.00
3273	READY-MIXED CONCRETE	1.00	1.00	1.00	0.00	1.00	0.00	4.00
3274	LIME	1.00	1.00	1.00	0.00	1.00	1.00	5.00
3275	GYPSUM PRODUCTS	3.00	1.00	1.00	0.00	1.00	1.00	7.00
3281	CUT STONE	1.00	1.00	1.00	0.00	1.00	0.00	4.00
3291	ABRASIVE PRODUCTS	3.00	1.00	1.00	0.00	1.00	1.00	7.00
3292	ASBESTOS PRODUCTS	3.00	1.00	1.00	0.00	1.00	3.00	9.00
3293	GASKETS PACKING	3.00	1.00	1.00	0.00	1.00	1.00	7.00
3295	MINERALS GROUND OR TREATED	1.00	1.00	1.00	0.00	1.00	0.00	4.00
3296	MINERAL WOOL	3.00	1.00	1.00	0.00	1.00	1.00	7.00
3297	NONCLAY REFRACTORIES	1.00	1.00	1.00	0.00	1.00	1.00	5.00
3299	NONMETALLIC PRODUCTS NEC	3.00	1.00	1.00	0.00	1.00	0.00	6.00
3312	BLAST FURNACES STEEL WORKS	1.00	1.00	0.00	0.00	1.00	5.00	8.00
3313	ELECTROMETALLURGICAL PRODUCT	1.00	1.00	0.00	0.00	1.00	5.00	8.00
3315	STEEL WIRE DRAWING AND NAILS	3.00	1.00	0.00	0.00	1.00	1.00	6.00
3316	COLD ROLLED STEEL SHEET+BAR	3.00	1.00	0.00	0.00	1.00	3.00	8.00
3317	STEEL PIPE AND TUBES	3.00	1.00	0.00	0.00	1.00	3.00	8.00
3321	GRAY IRON FOUNDRIES	3.00	1.00	1.00	0.00	1.00	1.00	7.00
3322	MALLEABLE IRON FOUNDRIES	3.00	1.00	1.00	0.00	1.00	5.00	11.00
3323	STEEL FOUNDRIES	3.00	1.00	1.00	0.00	1.00	3.00	9.00
3331	PRIMARY COPPER PRODUCTION	1.00	3.00	0.00	0.00	1.00	5.00	10.00
3332	PRIMARY LEAD PRODUCTION	1.00	3.00	0.00	0.00	1.00	1.00	6.00
3333	PRIMARY ZINC PRODUCTION	1.00	3.00	0.00	0.00	1.00	5.00	10.00
3334	PRIMARY ALUMINUM PRODUCTION	1.00	3.00	0.00	0.00	1.00	5.00	10.00
3339	PRIMARY NONFERROUS PROD NEC	1.00	3.00	0.00	0.00	1.00	1.00	6.00
3341	SECONDARY NONFERROUS METAL	3.00	3.00	0.00	0.00	1.00	0.00	7.00
3351	COPPER ROLLING & DRAWING	1.00	1.00	3.00	1.00	1.00	5.00	12.00
3352	ALUMINUM ROLLING & DRAWING	3.00	1.00	3.00	1.00	1.00	5.00	14.00
3356	ROLLING DRAWING PFC	3.00	1.00	3.00	1.00	1.00	3.00	12.00
3357	NONFERROUS WIRE DRAWING	3.00	1.00	3.00	1.00	1.00	3.00	12.00
3361	ALUMINUM CASTINGS	3.00	0.00	3.00	1.00	1.00	0.00	8.00
3362	BRASS BRONZE+COPPER CASTING	3.00	0.00	3.00	1.00	1.00	0.00	8.00
3369	NONFERROUS CASTINGS NEC	3.00	0.00	3.00	1.00	1.00	1.00	9.00
3391	IRON AND STEEL FORGINGS	3.00	1.00	1.00	1.00	1.00	3.00	10.00
3399	PRIMARY METAL PRODUCTS NEC	1.00	1.00	1.00	1.00	1.00	0.00	5.00
3411	METAL CANS	5.00	0.00	3.00	0.00	1.00	3.00	12.00
3421	CUTLERY	3.00	0.00	3.00	1.00	1.00	1.00	9.00
3423	HAND EDGE TOOLS *INUS SAWS	3.00	0.00	3.00	1.00	1.00	1.00	9.00
3425	HAND SAWS AND SAW BLADES	3.00	0.00	3.00	1.00	1.00	1.00	9.00
3429	HARDWARE NEC	3.00	0.00	3.00	1.00	1.00	1.00	9.00

TABLE A-2. (continued)

3431	IRON METAL SANITARY WARE	3.00	0.00	3.00	1.00	1.00	1.00	9.00
3432	BRASS PLUMBING FITTINGS	3.00	0.00	3.00	1.00	1.00	1.00	9.00
3433	NON-ELECTRIC HEATING EQUIP	3.00	0.00	3.00	1.00	1.00	1.00	9.00
3441	FABRICATED STRUCTURAL STEEL	3.00	0.00	3.00	0.00	1.00	1.00	8.00
3442	METAL DOORS SASH + FRAMES	3.00	0.00	3.00	0.00	1.00	0.00	7.00
3443	FABRICATED PLATE WORK	5.00	0.00	3.00	0.00	1.00	1.00	10.00
3444	SHEET METAL WORK	3.00	0.00	3.00	0.00	1.00	0.00	7.00
3446	ARCHITECTURAL METAL WORK	5.00	0.00	3.00	0.00	1.00	0.00	9.00
3449	MISCELLANEOUS METAL WORK	5.00	0.00	3.00	0.00	1.00	1.00	10.00
3451	SCREW MACHINE PRODUCTS	5.00	0.00	5.00	1.00	1.00	0.00	12.00
3452	BOLTS NUTS SCREWS + WASHERS	5.00	0.00	5.00	1.00	1.00	1.00	13.00
3461	METAL STAMPINGS	3.00	0.00	3.00	1.00	1.00	1.00	9.00
3471	ELECTROPLATING	1.00	0.00	3.00	1.00	1.00	0.00	6.00
3479	COATING ENGRAVING ETC	3.00	0.00	3.00	1.00	1.00	0.00	8.00
3481	MISC FABRICATED WIRE PRODUCT	3.00	0.00	3.00	1.00	1.00	0.00	8.00
3491	METAL SHIPPING BARRELS+KEGS	3.00	0.00	3.00	1.00	1.00	1.00	9.00
3492	SAFES AND VAULTS	5.00	0.00	3.00	1.00	1.00	1.00	11.00
3493	STEEL SPRINGS	3.00	0.00	3.00	1.00	1.00	1.00	9.00
3494	VALVES PIPE FITTINGS	3.00	0.00	3.00	1.00	1.00	1.00	9.00
3496	COLLAPSIBLE TIRES	5.00	0.00	3.00	1.00	1.00	3.00	13.00
3497	METAL FOIL AND LEAF	3.00	0.00	3.00	1.00	1.00	1.00	9.00
3498	FABRICATED PIPES + FITTINGS	3.00	0.00	3.00	1.00	1.00	0.00	8.00
3499	FABRICATED METAL PRODUCT NEC	3.00	0.00	3.00	1.00	1.00	0.00	8.00
3511	STEAM ENGINES AND TURBINES	1.00	1.00	1.00	1.00	1.00	5.00	10.00
3519	INTERNAL COMBUSTION ENGIN NEC	3.00	1.00	1.00	1.00	1.00	5.00	12.00
3522	FARM MACHINERY AND EQUIPMENT	3.00	1.00	1.00	0.00	1.00	1.00	7.00
3531	CONSTRUCTION MACHINERY	3.00	1.00	1.00	1.00	1.00	3.00	10.00
3532	MINING MACHINERY + EQUIPMENT	5.00	1.00	1.00	1.00	1.00	1.00	10.00
3533	OIL FIELD MACHINERY + EQUIP	3.00	1.00	1.00	1.00	1.00	1.00	8.00
3534	ELEVATORS	5.00	1.00	1.00	1.00	1.00	1.00	10.00
3535	CONVEYORS	5.00	1.00	1.00	1.00	1.00	1.00	10.00
3536	HOISTS CRANES + MONORAILS	3.00	1.00	1.00	1.00	1.00	1.00	8.00
3537	INDUSTRIAL TRUCKS + TRACTORS	5.00	1.00	1.00	1.00	1.00	1.00	10.00
3541	METAL CUTTING MACHINE TOOLS	5.00	0.00	3.00	1.00	1.00	1.00	11.00
3542	METAL FORMING MACHINE TOOLS	5.00	0.00	3.00	1.00	1.00	1.00	11.00
3544	SPECIAL DIES TOOLS DYE SETS	3.00	0.00	3.00	1.00	1.00	0.00	8.00
3545	MACHINE TOOL ACCESSORIES	5.00	0.00	3.00	1.00	1.00	1.00	11.00
3548	METALWORKING MACHINERY	3.00	0.00	3.00	1.00	1.00	1.00	9.00
3551	FOOD PRODUCTS MACHINERY	5.00	0.00	3.00	1.00	1.00	1.00	11.00
3552	TEXTILE MACHINERY	3.00	0.00	3.00	1.00	1.00	1.00	9.00
3553	WOODWORKING MACHINERY	3.00	0.00	3.00	1.00	1.00	1.00	9.00
3554	PAPER INDUSTRIES MACHINERY	5.00	0.00	3.00	1.00	1.00	1.00	11.00
3555	PRINTING TRADES MACHINERY	5.00	0.00	3.00	1.00	1.00	1.00	11.00
3559	SPECIAL INDUSTRY MACHINERY NEC	3.00	0.00	3.00	1.00	1.00	1.00	9.00
3561	PUMPS AND COMPRESSORS	5.00	0.00	3.00	1.00	1.00	1.00	11.00
3562	BALL AND ROLLER BEARINGS	3.00	0.00	3.00	1.00	1.00	5.00	13.00
3564	BLOWERS AND FANS	5.00	0.00	3.00	1.00	1.00	1.00	11.00
3565	INDUSTRIAL PATTERNS	5.00	0.00	3.00	1.00	1.00	0.00	10.00
3566	POWER TRANSMISSION EQUIPMENT	3.00	0.00	3.00	1.00	1.00	1.00	9.00
3567	INDUSTRIAL FURNACES + OVENS	5.00	0.00	3.00	1.00	1.00	1.00	11.00
3569	OTHER INDUSTRIAL MACHINERY	3.00	0.00	3.00	1.00	1.00	1.00	9.00
3572	TYPEWRITERS	5.00	0.00	3.00	1.00	1.00	5.00	15.00
3573	ELECTRONIC COMPUTING EQUIP	3.00	0.00	3.00	1.00	1.00	5.00	13.00
3574	CALCULATING + ACCTG MACHINES	5.00	0.00	3.00	1.00	1.00	5.00	15.00
3576	SCALES AND BALANCES	5.00	0.00	3.00	1.00	1.00	1.00	11.00
3579	OTHER OFFICE MACHINES	5.00	0.00	3.00	1.00	1.00	1.00	11.00

TABLE A-2.(continued)

3581	AUTOMATIC VENDING MACHINES	5.00	0.00	3.00	1.00	1.00	1.00	11.00
3582	COMMERCIAL LAUNDRY EQUIPMENT	5.00	0.00	3.00	1.00	1.00	1.00	11.00
3585	REFRIGERATION EQUIPMENT	3.00	0.00	3.00	1.00	1.00	1.00	9.00
3586	MEASURING & DISPENSING PUMPS	5.00	0.00	3.00	1.00	1.00	1.00	11.00
3589	SERVICE INDUSTRY MACHINES NEC	5.00	0.00	3.00	1.00	1.00	0.00	10.00
3599	MISC MACHINERY MINUS ELECT	3.00	0.00	5.00	1.00	1.00	0.00	10.00
3611	ELECTRIC MEASURING EQUIPMENT	5.00	0.00	3.00	1.00	3.00	1.00	13.00
3612	POWER TRANSFORMERS	3.00	0.00	3.00	1.00	3.00	3.00	13.00
3613	SWITCHGEAR SWITCHBOARD EQPMT	3.00	0.00	3.00	1.00	3.00	1.00	11.00
3621	MOTORS AND GENERATORS	3.00	0.00	3.00	1.00	3.00	5.00	15.00
3622	INDUSTRIAL CONTROLS	3.00	0.00	3.00	1.00	3.00	1.00	11.00
3623	WELDING APPARATUS	5.00	0.00	3.00	1.00	3.00	1.00	13.00
3624	CARBON & GRAPHITE PRODUCTS	3.00	0.00	3.00	1.00	3.00	3.00	13.00
3629	ELECTRICAL IND APPARATUS NEC	3.00	0.00	3.00	1.00	3.00	1.00	11.00
3631	HOUSEHOLD COOKING EQUIPMENT	5.00	3.00	0.00	0.00	3.00	5.00	16.00
3632	HOUSEHOLD REFRIGERATORS	3.00	3.00	0.00	0.00	3.00	5.00	14.00
3633	HOUSEHOLD LAUNDRY EQUIPMENT	3.00	3.00	0.00	0.00	3.00	5.00	14.00
3634	ELECTRIC HOUSEWARES & FANS	3.00	3.00	0.00	0.00	3.00	3.00	12.00
3635	HOUSEHOLD VACUUM CLEANERS	5.00	3.00	0.00	0.00	3.00	5.00	16.00
3636	SEWING MACHINES	5.00	3.00	0.00	0.00	3.00	1.00	12.00
3639	HOUSEHOLD APPLIANCES NEC	3.00	3.00	0.00	0.00	3.00	3.00	12.00
3641	ELECTRIC LAMPS	5.00	0.00	3.00	1.00	3.00	5.00	17.00
3642	LIGHTING FIXTURES	3.00	0.00	3.00	1.00	3.00	1.00	11.00
3643	CURRENT-CARRYING WIRING EQUI	3.00	0.00	3.00	1.00	3.00	1.00	11.00
3644	NONCURRENT-CARRYING WIRING EQ	3.00	0.00	3.00	1.00	3.00	1.00	11.00
3651	RADIO TV RECEIVING SETS	5.00	0.00	3.00	1.00	3.00	5.00	17.00
3652	PHONOGRAPH RECORDS	3.00	0.00	3.00	1.00	3.00	0.00	10.00
3661	TELEPHONE & TELEGRAPH EQUIP	5.00	0.00	1.00	3.00	3.00	5.00	17.00
3662	RADIO TV TRANSMITTING EQUIP	5.00	0.00	1.00	3.00	3.00	5.00	17.00
3671	ELECTRON TUBES RECEIVING	5.00	0.00	3.00	5.00	3.00	5.00	21.00
3672	CATHODE RAY PICTURE TUBES	3.00	0.00	3.00	5.00	3.00	5.00	19.00
3673	ELECTRON TUBES TRANSMITTING	3.00	0.00	3.00	5.00	3.00	5.00	19.00
3674	SEMICONDUCTORS	3.00	0.00	3.00	5.00	3.00	5.00	19.00
3679	ELECTRONIC COMPONENTS NEC	3.00	0.00	3.00	5.00	3.00	1.00	15.00
3691	STORAGE BATTERIES	3.00	0.00	3.00	1.00	3.00	1.00	11.00
3692	PRIMARY BATTERIES-WET AND DRY	5.00	0.00	3.00	1.00	3.00	3.00	15.00
3694	ELECTRICAL EQ FOR ENGINES	3.00	0.00	3.00	1.00	3.00	3.00	13.00
3699	ELECTRICAL EQUIPMENT NEC	5.00	0.00	3.00	1.00	3.00	0.00	12.00
3711	MOTOR VEHICLES	3.00	3.00	0.00	1.00	1.00	5.00	13.00
3712	PASSENGER CAR BODIES	5.00	3.00	0.00	1.00	3.00	5.00	17.00
3713	TRUCK AND BUS BODIES	5.00	1.00	1.00	0.00	3.00	0.00	10.00
3714	MOTOR VEHICLE PARTS	3.00	3.00	0.00	1.00	3.00	3.00	13.00
3715	TRUCK TRAILERS	3.00	1.00	1.00	0.00	3.00	1.00	9.00
3721	AIRCRAFT	5.00	0.00	1.00	3.00	3.00	5.00	17.00
3722	AIRCRAFT ENGINES & PARTS	3.00	0.00	1.00	3.00	3.00	5.00	15.00
3723	AIRCRAFT PROPELLERS & PARTS	5.00	0.00	1.00	3.00	3.00	5.00	17.00
3729	AIRCRAFT PARTS & EQ NEC	3.00	0.00	1.00	3.00	3.00	3.00	13.00
3731	SHIP BUILDING AND REPAIRING	3.00	0.00	3.00	1.00	3.00	5.00	15.00
3732	BOAT BUILDING AND REPAIRING	5.00	0.00	3.00	1.00	3.00	0.00	12.00
3741	LOCOMOTIVES AND PARTS	5.00	1.00	1.00	1.00	3.00	5.00	16.00
3742	RAILROAD AND STREETCARS	5.00	1.00	1.00	1.00	3.00	5.00	16.00
3751	MOTORCYCLES BICYCLES & PARTS	5.00	1.00	1.00	1.00	3.00	1.00	12.00
3791	TRAILER COACHES	5.00	1.00	1.00	1.00	3.00	1.00	12.00
3799	TRANSPORTATION EQUIPMENT NEC	5.00	1.00	1.00	1.00	3.00	0.00	11.00
3811	LABORATORY RESEARCH EQUIPMEN	5.00	0.00	3.00	0.00	1.00	1.00	10.00
3821	MECH MEASURING DEVICES	3.00	0.00	3.00	1.00	1.00	1.00	9.00

TABLE A-2.(continued)

3822	AUTOMAT TEMPERATURE CONTROLS	5.00	0.00	3.00	1.00	1.00	5.00	15.00
3831	OPTICAL INSTRUMENTS + LENSES	5.00	0.00	3.00	1.00	1.00	1.00	11.00
3841	SURGICAL + MEDICAL INSTRUMEN	5.00	0.00	3.00	1.00	1.00	1.00	11.00
3842	SURGICAL APPLIANCES + SUPPLY	3.00	0.00	3.00	1.00	1.00	0.00	8.00
3843	DENTAL EQUIP AND SUPPLIES	5.00	0.00	3.00	1.00	1.00	0.00	10.00
3851	OPHTHALMIC GOODS	3.00	0.00	3.00	1.00	1.00	1.00	9.00
3861	PHOTOGRAPHIC EQUIP + SUPPLY	3.00	0.00	3.00	1.00	1.00	3.00	11.00
3871	WATCHES CLOCKS AND PARTS	3.00	0.00	3.00	1.00	1.00	3.00	11.00
3872	WATCHCASES	5.00	0.00	3.00	1.00	1.00	1.00	11.00
3911	JEWELRY PRECIOUS METAL	5.00	1.00	1.00	1.00	1.00	0.00	9.00
3912	JEWELERS FINDINGS + MATERIAL	5.00	1.00	1.00	1.00	1.00	0.00	9.00
3913	LAPIDARY WORK	5.00	1.00	1.00	1.00	1.00	0.00	9.00
3914	SILVERWARE + PLATED WARE	3.00	1.00	1.00	1.00	1.00	1.00	8.00
3931	MUSICAL INSTRUMENTS	5.00	0.00	3.00	1.00	1.00	1.00	11.00
3941	GAMES + TOYS MINIS DOLLS	3.00	1.00	1.00	1.00	1.00	1.00	8.00
3942	DOLLS	5.00	1.00	1.00	1.00	1.00	0.00	9.00
3943	CHILDRENS VEHICLES	5.00	1.00	1.00	1.00	1.00	1.00	10.00
3949	SPORTING GOODS NEC	5.00	1.00	1.00	1.00	1.00	0.00	9.00
3951	PENS POINTS + MECH PENCILS	5.00	0.00	3.00	1.00	1.00	1.00	11.00
3952	PENCILS CHAYONS ARTIST MATLS	5.00	0.00	3.00	1.00	1.00	1.00	11.00
3953	MARKING DEVICES	5.00	0.00	3.00	1.00	1.00	0.00	10.00
3955	CARBON PAPER + INKED RIBBON	5.00	0.00	3.00	1.00	1.00	1.00	11.00
3961	COSTUME JEWELRY + NOVELTIES	3.00	1.00	1.00	1.00	1.00	0.00	7.00
3962	FEATHERS ARTIFICIAL FLOWERS	5.00	1.00	1.00	1.00	1.00	0.00	9.00
3963	BUTTONS	5.00	1.00	1.00	1.00	1.00	0.00	9.00
3964	NEEDLES PINS HOOKS + EYES	3.00	1.00	1.00	1.00	1.00	1.00	8.00
3991	BROOMS AND BRUSHES	5.00	0.00	3.00	1.00	1.00	0.00	10.00
3993	SIGNS + ADVERTISING DISPLAYS	5.00	0.00	3.00	1.00	1.00	0.00	10.00
3994	HAIRCUTTERS GOODS	5.00	0.00	3.00	1.00	1.00	0.00	10.00
3996	LINOLEUM+FLOOR COVERING NEC	5.00	0.00	3.00	1.00	1.00	5.00	15.00
3999	MANUFACTURING INDUSTRIES NEC	3.00	0.00	3.00	1.00	1.00	0.00	8.00

TABLE A-3.
BATTELLE SCREENING MATRIX

DELAWARE - MIDDLE REGION

- 1 WATER INTAKE PER EMPLOYEE PER YEAR
- 2 PERCENT OF TOTAL SHIPMENTS BY RAIL
- 3 PERCENT OF TOTAL SHIPMENTS BY TRUCK (HIGHWAY)
- 4 AVERAGE NUMBER OF EMPLOYEES PER ESTABLISHMENT
- 5 PERCENT LABORERS IN THE INDUSTRY
- 6 PERCENT OF TOTAL ESTABLISHMENTS LOCATED IN URBAN AREAS

2011 MEAT PACKING	5.00	3.00	1.00	3.00	3.00	1.00	16.00
2013 SAUSAGES	5.00	5.00	1.00	5.00	3.00	0.00	19.00
2015 POULTRY	5.00	5.00	1.00	3.00	3.00	5.00	22.00
2021 CREAMERY BUTTER	1.00	3.00	5.00	5.00	3.00	5.00	22.00
2022 CHEESE	5.00	3.00	5.00	5.00	3.00	5.00	26.00
2023 CONDENSED MILK	1.00	3.00	5.00	5.00	3.00	5.00	22.00
2024 ICE CREAM	5.00	3.00	5.00	5.00	3.00	1.00	22.00
2026 FLUID MILK	5.00	3.00	5.00	5.00	3.00	1.00	22.00
2031 CANNED FISH	5.00	3.00	5.00	0.00	3.00	3.00	19.00
2032 CANNED SPECIALTIES	5.00	3.00	5.00	1.00	3.00	1.00	18.00
2033 CANNED FRUITS VEGETABLES JAM	5.00	3.00	5.00	3.00	3.00	3.00	22.00
2034 DRIED FRUITS	5.00	3.00	5.00	3.00	3.00	1.00	20.00
2035 PICKLED FRUITS VEGETABLES	5.00	3.00	5.00	5.00	3.00	1.00	22.00
2036 FRESH OR FROZEN FISH	5.00	3.00	5.00	5.00	3.00	5.00	26.00
2037 FROZEN FRUITS JUICES	1.00	3.00	5.00	3.00	3.00	5.00	20.00
2041 FLOUR AND GRAIN PRODUCTS	5.00	1.00	3.00	5.00	3.00	3.00	20.00
2042 PREPARED FEEDS FOR ANIMAL	5.00	1.00	3.00	5.00	3.00	3.00	20.00
2043 CEREAL PREPARATIONS	5.00	1.00	3.00	0.00	3.00	3.00	15.00
2044 RICE MILLING	3.00	1.00	3.00	3.00	3.00	3.00	16.00
2045 PREPARED FLOUR	3.00	1.00	3.00	3.00	3.00	0.00	13.00
2046 WET CORN MILLING	1.00	1.00	3.00	0.00	3.00	0.00	8.00
2051 BREAD AND BAKERY PRODUCTS	3.00	1.00	3.00	3.00	3.00	0.00	13.00
2052 COOKIES AND CRACKERS	5.00	1.00	3.00	3.00	3.00	0.00	15.00
2061 CANE SUGAR MINDS REFINING	1.00	1.00	3.00	3.00	3.00	5.00	16.00
2062 CANE SUGAR REFINING	1.00	1.00	3.00	0.00	3.00	0.00	8.00
2063 BEET SUGAR	1.00	1.00	3.00	1.00	3.00	5.00	14.00
2071 CANDY PRODUCTS	5.00	5.00	1.00	3.00	3.00	0.00	17.00
2072 CHOCOLATE PRODUCTS	3.00	5.00	1.00	1.00	3.00	0.00	13.00
2073 CHEATING BOM	3.00	5.00	1.00	0.00	3.00	0.00	12.00
2082 MALT LIQUORS	1.00	3.00	5.00	0.00	3.00	1.00	13.00
2083 MALT	1.00	3.00	5.00	5.00	3.00	1.00	18.00
2084 WINES AND BRANDY	1.00	3.00	5.00	5.00	3.00	1.00	18.00
2085 DISTILLED BLENDED LIQUORS	1.00	3.00	5.00	1.00	3.00	1.00	14.00
2086 BOTTLED CANNED SOFT DRINKS	5.00	5.00	0.00	5.00	3.00	1.00	19.00
2087 FLAVORING EXTRACTS SIPUPS	5.00	5.00	0.00	5.00	3.00	0.00	18.00
2091 COTTONSEED OIL MILLS	3.00	3.00	3.00	5.00	3.00	5.00	22.00
2092 SOYBEAN OIL MILLS	1.00	3.00	3.00	3.00	3.00	3.00	16.00
2093 OTHER VEGETABLE OIL MILLS	1.00	3.00	3.00	5.00	3.00	1.00	16.00
2094 ANIMAL FATS OILS	1.00	5.00	1.00	5.00	3.00	5.00	20.00
2095 ROASTED COFFEE	5.00	3.00	3.00	3.00	3.00	5.00	22.00
2096 SHORTENING MARGARINE	1.00	3.00	3.00	3.00	3.00	0.00	13.00
2097 MANUFACTURED ICE	1.00	3.00	3.00	5.00	3.00	3.00	18.00
2098 MACARONI SPAGHETTI NOODLES	3.00	3.00	3.00	5.00	3.00	0.00	17.00
2099 FOOD PREPARATIONS	1.00	3.00	3.00	5.00	3.00	0.00	15.00
2111 CIGARETTES	5.00	3.00	5.00	0.00	1.00	0.00	14.00
2121 CIGARS	3.00	3.00	5.00	3.00	1.00	0.00	15.00
2131 TOBACCO AND SNIFF	3.00	3.00	5.00	3.00	1.00	0.00	15.00

TABLE A-3.(continued)

2141	TOBACCO STEMMING REPLYING	3.00	3.00	5.00	3.00	1.00	3.00	18.00
2211	BROAD WOVEN COTTON FABRIC	5.00	5.00	0.00	0.00	1.00	5.00	16.00
2221	BROAD WOVEN MANMADE FIBER	5.00	5.00	0.00	0.00	1.00	3.00	14.00
2231	BROAD WOVEN WOOL FABRICS	5.00	5.00	0.00	3.00	1.00	5.00	19.00
2241	NARROW FABRICS	5.00	5.00	0.00	3.00	1.00	1.00	15.00
2251	WOMENS HOSIERY	5.00	5.00	1.00	1.00	1.00	3.00	16.00
2252	OTHER HOSIERY	5.00	5.00	1.00	3.00	1.00	5.00	20.00
2253	KNIT OUTERWEAR MILLS	5.00	5.00	1.00	3.00	1.00	1.00	16.00
2254	KNIT UNDERWEAR MILLS	5.00	5.00	1.00	0.00	1.00	3.00	15.00
2256	KNIT FABRIC MILLS	5.00	5.00	0.00	3.00	1.00	3.00	17.00
2259	OTHER KNITTING MILLS	3.00	5.00	1.00	5.00	1.00	1.00	16.00
2261	COTTON FINISHERS	1.00	5.00	0.00	1.00	1.00	0.00	8.00
2262	MANMADE FIBER SILK FINISHERS	1.00	5.00	0.00	3.00	1.00	0.00	10.00
2269	OTHER TEXTILE FINISHERS	5.00	5.00	0.00	3.00	1.00	1.00	15.00
2271	WOVEN CARPETS AND RUGS	3.00	5.00	0.00	3.00	1.00	5.00	17.00
2272	TUFTED CARPETS AND RUGS	5.00	5.00	0.00	3.00	1.00	3.00	17.00
2279	OTHER CARPETS AND RUGS	3.00	5.00	0.00	5.00	1.00	5.00	19.00
2281	YARN SPINNING MILLS	5.00	5.00	0.00	1.00	1.00	3.00	15.00
2282	YARN THROU-ING TWISTING MILLS	5.00	5.00	0.00	3.00	1.00	3.00	17.00
2283	WOOL YARN MILLS	5.00	5.00	0.00	3.00	1.00	3.00	17.00
2284	THREAD MILLS	5.00	5.00	0.00	1.00	1.00	5.00	17.00
2291	FELT GOODS MINUS WOVEN FELTS	5.00	5.00	0.00	3.00	1.00	1.00	15.00
2292	LACE GOODS	3.00	5.00	0.00	5.00	1.00	0.00	14.00
2293	PADDINGS UPHOLSTERY FILLINGS	3.00	5.00	0.00	5.00	1.00	0.00	14.00
2294	PROCESSED WASTE	3.00	5.00	0.00	5.00	1.00	1.00	15.00
2295	ARTIFICIAL LEATHER OILCLOTH	5.00	5.00	0.00	3.00	1.00	0.00	14.00
2296	TIRE CORD AND FABRIC	3.00	5.00	0.00	0.00	1.00	5.00	14.00
2297	WOOL SCOURING AND WORSTED	5.00	5.00	0.00	3.00	1.00	3.00	17.00
2298	CORRAGE AND TWINE	1.00	5.00	0.00	3.00	1.00	3.00	13.00
2299	OTHER TEXTILE GOODS	5.00	5.00	0.00	5.00	1.00	0.00	16.00
2311	MENS BOYS SUITS AND COATS	3.00	5.00	1.00	3.00	1.00	0.00	13.00
2321	MENS BOYS SHIRTS AND COLLARS	3.00	5.00	1.00	3.00	1.00	3.00	16.00
2322	MENS BOYS UNDERWEAR	3.00	5.00	1.00	1.00	1.00	5.00	16.00
2323	MENS BOYS NECKWEAR	3.00	5.00	1.00	5.00	1.00	0.00	15.00
2327	MENS BOYS SEPARATE TROUSERS	3.00	5.00	1.00	3.00	1.00	3.00	16.00
2328	MENS BOYS WORK CLOTHING	3.00	5.00	1.00	1.00	1.00	5.00	16.00
2329	OTHER MENS BOYS CLOTHING	3.00	5.00	1.00	3.00	1.00	3.00	16.00
2331	WOMENS MISSES HOUSES SHIRTS	3.00	5.00	1.00	3.00	1.00	0.00	13.00
2335	WOMENS MISSES DRESSES	3.00	5.00	1.00	5.00	1.00	0.00	15.00
2337	WOMENS MISSES SKIRTS COATS	3.00	5.00	1.00	5.00	1.00	0.00	15.00
2339	OTHER WOMEN MISSES OUTERWEAR	3.00	5.00	1.00	3.00	1.00	0.00	13.00
2341	WOMENS UNDERWEAR NIGHTWEAR	3.00	5.00	1.00	3.00	1.00	1.00	14.00
2342	CONSETS	3.00	5.00	1.00	3.00	1.00	1.00	14.00
2351	MILLINERY	3.00	5.00	1.00	5.00	1.00	0.00	15.00
2352	HATS AND CAPS	3.00	5.00	1.00	5.00	1.00	0.00	15.00
2361	CHILDRENS DRESSES HOUSES	3.00	5.00	1.00	3.00	1.00	0.00	13.00
2363	CHILDRENS COATS SUITS	3.00	5.00	1.00	5.00	1.00	0.00	15.00
2369	OTHER CHILDRENS OUTERWEAR	3.00	5.00	1.00	3.00	1.00	1.00	14.00
2371	FUR GOODS	3.00	5.00	1.00	5.00	1.00	0.00	15.00
2381	DRESS AND WORK GLOVES	3.00	5.00	1.00	3.00	1.00	5.00	18.00
2384	ROBES AND DRESSING GOWNS	3.00	5.00	1.00	5.00	1.00	1.00	16.00
2385	RAINCOATS	3.00	5.00	1.00	3.00	1.00	1.00	14.00
2386	LEATHER CLOTHING	3.00	5.00	1.00	5.00	1.00	0.00	15.00
2387	APPAREL	3.00	5.00	1.00	5.00	1.00	0.00	15.00
2389	OTHER APPAREL & ACCESSORIES	3.00	5.00	1.00	5.00	1.00	0.00	15.00
2391	CURTAINS AND DRAPERIES	3.00	5.00	1.00	5.00	1.00	0.00	15.00

TABLE A-3.(continued)

2392	OTHER HOUSEFURNISHINGS	3.00	5.00	1.00	5.00	1.00	3.00	18.00
2393	TEXTILE BAGS	3.00	5.00	1.00	5.00	1.00	0.00	15.00
2394	CANVAS	3.00	5.00	1.00	5.00	1.00	0.00	15.00
2395	PLEATING & NOVELTY STITCHING	3.00	5.00	1.00	5.00	1.00	0.00	15.00
2396	AUTOMOTIVE TRIMMINGS	3.00	5.00	1.00	5.00	1.00	0.00	15.00
2397	SCHIFFLI EMBROIDERIES	3.00	5.00	1.00	5.00	1.00	0.00	15.00
2399	OTHER FABRICATED TEXTILES	3.00	5.00	1.00	5.00	1.00	0.00	15.00
2411	LOGGING CAMPS CONTRACTORS	3.00	3.00	5.00	5.00	1.00	5.00	22.00
2421	SAWMILLS PLANING MILLS	3.00	3.00	5.00	5.00	1.00	5.00	22.00
2426	HARDWOOD DIMENSION MILLS	3.00	3.00	5.00	5.00	1.00	5.00	22.00
2429	SPECIAL PRODUCT SAWMILLS	3.00	3.00	5.00	5.00	1.00	5.00	22.00
2431	MILLWORK	3.00	1.00	3.00	5.00	1.00	1.00	14.00
2432	VENEER AND PLYWOOD	1.00	1.00	3.00	3.00	1.00	5.00	14.00
2433	PREFAB WOODEN FLOORS	3.00	1.00	3.00	5.00	1.00	3.00	16.00
2441	WOODEN BOXES	3.00	3.00	5.00	5.00	1.00	5.00	22.00
2442	WIREBOUND BOXES CRATES	3.00	3.00	5.00	3.00	1.00	5.00	20.00
2443	VENEER PLYWOOD CONTAINERS	3.00	3.00	5.00	5.00	1.00	5.00	22.00
2445	COOPERAGE	3.00	3.00	5.00	5.00	1.00	1.00	18.00
2491	WOOD PRESERVING	5.00	3.00	5.00	5.00	1.00	3.00	22.00
2499	WOOD PRODUCTS	1.00	3.00	5.00	5.00	1.00	0.00	15.00
2511	WOOD HOUSEHOLD FURNITURE	3.00	5.00	1.00	3.00	1.00	3.00	16.00
2512	UPHOLSTERED WOOD HOUSEHOLD FURN	3.00	5.00	1.00	5.00	1.00	1.00	16.00
2514	METAL HOUSEHOLD FURNITURE	3.00	5.00	1.00	3.00	1.00	1.00	14.00
2515	MATTRESSES AND MATTRESS SPRINGS	3.00	5.00	1.00	5.00	1.00	0.00	15.00
2519	OTHER HOUSEHOLD FURNITURE	3.00	5.00	1.00	5.00	1.00	0.00	15.00
2521	WOOD OFFICE FURNITURE	3.00	5.00	1.00	5.00	1.00	1.00	16.00
2522	METAL OFFICE FURNITURE	3.00	5.00	1.00	3.00	1.00	1.00	14.00
2531	PUBLIC BUILDING FURNITURE	3.00	5.00	1.00	3.00	1.00	3.00	16.00
2541	WOOD PARTITIONS & SHELVING	3.00	5.00	1.00	5.00	1.00	0.00	15.00
2542	METAL PARTITIONS & SHELVING	3.00	5.00	1.00	5.00	1.00	0.00	15.00
2591	VENETIAN BLINDS & SHADES	3.00	5.00	1.00	5.00	1.00	1.00	16.00
2599	OTHER FURNITURE & FIXTURES	3.00	5.00	1.00	5.00	1.00	0.00	15.00
2611	PULP MILLS	1.00	1.00	3.00	1.00	1.00	5.00	12.00
2621	PAPER MILLS	1.00	1.00	3.00	0.00	1.00	3.00	9.00
2631	PAPERBOARD MILLS	1.00	1.00	3.00	1.00	1.00	3.00	10.00
2641	PAPER COATING AND GLAZING	5.00	3.00	5.00	3.00	1.00	1.00	18.00
2642	ENVELOPES	3.00	3.00	5.00	3.00	1.00	0.00	15.00
2643	BAGS MINUS TEXTILE BAGS	5.00	3.00	5.00	3.00	1.00	1.00	18.00
2644	WALLPAPER	3.00	3.00	5.00	5.00	1.00	1.00	18.00
2645	DIE CUT PAPER & CARDBOARD	3.00	3.00	5.00	5.00	1.00	0.00	17.00
2646	PRESSED WOODEN PULP GOODS	1.00	3.00	5.00	3.00	1.00	3.00	16.00
2647	SANITARY PAPER	5.00	3.00	5.00	1.00	1.00	1.00	16.00
2649	OTHER PAPERBOARD	5.00	3.00	5.00	3.00	1.00	1.00	18.00
2651	FOLDING PAPERBOARD BOXES	5.00	5.00	1.00	3.00	1.00	0.00	15.00
2652	SET-UP PAPERBOARD BOXES	3.00	5.00	1.00	5.00	1.00	0.00	15.00
2653	CORRUGATED FIBER BOXES	3.00	5.00	1.00	3.00	1.00	3.00	13.00
2654	SANITARY FOOD CONTAINERS	5.00	5.00	1.00	3.00	1.00	5.00	20.00
2655	FIBER CASE TUBES DRUMS	3.00	5.00	1.00	3.00	1.00	1.00	14.00
2661	BUILDING PAPER	1.00	1.00	3.00	3.00	1.00	3.00	12.00
2711	NEWSPAPER PUBLISHING & PRINT	3.00	3.00	5.00	5.00	1.00	1.00	18.00
2721	PERIODICAL PUBLISHING & PRINT	3.00	3.00	5.00	5.00	1.00	0.00	17.00
2731	BOOKS PUBLISHING & PRINTING	3.00	3.00	5.00	3.00	1.00	0.00	15.00
2732	BOOK PRINTING	3.00	3.00	5.00	3.00	1.00	1.00	16.00
2741	OTHER PUBLISHING	3.00	3.00	5.00	5.00	1.00	0.00	17.00
2751	COMMERCIAL PRINTING	3.00	5.00	1.00	5.00	1.00	0.00	15.00
2752	LITHOGRAPHIC PRINTING	3.00	5.00	1.00	5.00	1.00	0.00	15.00

TABLE A-3.(continued)

2753	ENGRAVING	3.00	5.00	1.00	5.00	1.00	0.00	15.00
2761	MANIFOLD MASTERS, FORMS	3.00	3.00	5.00	3.00	1.00	5.00	20.00
2771	GREETING CARDS	3.00	3.00	5.00	3.00	1.00	0.00	15.00
2782	BLANK BOOKS + LOOSE LEAF BINDER	3.00	3.00	5.00	3.00	1.00	0.00	15.00
2791	TYPESETTING	3.00	5.00	1.00	5.00	1.00	0.00	15.00
2793	PHOTOENGRAVING	3.00	5.00	1.00	5.00	1.00	0.00	15.00
2794	ELECTROTYPING STENOGRAPHY	3.00	5.00	1.00	5.00	1.00	0.00	15.00
2812	ALKALIES AND CHLORINE	1.00	3.00	3.00	0.00	3.00	0.00	10.00
2813	INDUSTRIAL GASES	1.00	3.00	3.00	5.00	3.00	0.00	15.00
2815	DYES CYCLIC CHLORIDES	1.00	3.00	3.00	1.00	3.00	1.00	12.00
2816	INORGANIC PIGMENTS	1.00	3.00	3.00	3.00	3.00	1.00	14.00
2818	ORGANIC CHEMICALS NEC	1.00	3.00	3.00	1.00	3.00	1.00	12.00
2819	INORGANIC CHEMICALS NEC	1.00	3.00	3.00	3.00	3.00	1.00	14.00
2821	PLASTICS MATERIALS + RESINS	1.00	3.00	5.00	3.00	3.00	1.00	16.00
2822	SYNTHETIC RUBBER	1.00	3.00	5.00	0.00	3.00	0.00	12.00
2823	CELLULOSE MAN-MADE FIBERS	1.00	3.00	5.00	0.00	3.00	5.00	17.00
2824	SYNTHETIC ORGANIC FIBERS	1.00	3.00	5.00	0.00	3.00	5.00	17.00
2831	BIOLOGICAL PRODUCTS	5.00	3.00	5.00	3.00	3.00	1.00	20.00
2833	MEDICINAL CHEMICALS	1.00	3.00	5.00	3.00	3.00	1.00	16.00
2834	PHARMACEUTICAL PREPARATIONS	5.00	3.00	5.00	3.00	3.00	0.00	19.00
2841	SOAP AND DETERGENTS	1.00	5.00	1.00	5.00	3.00	0.00	15.00
2842	SPECIALTY CLEANING PRODUCTS	5.00	5.00	1.00	5.00	3.00	0.00	19.00
2843	SURFACE ACTIVE AGENTS	1.00	5.00	1.00	5.00	3.00	0.00	15.00
2844	PERFUMES COSMETICS	3.00	5.00	1.00	3.00	3.00	0.00	15.00
2851	PAINTS VARNISHES ENAMELS	5.00	5.00	1.00	5.00	3.00	0.00	19.00
2861	GUM AND WOOD CHEMICALS	1.00	3.00	5.00	5.00	3.00	5.00	22.00
2871	FERTILIZERS	1.00	3.00	5.00	3.00	3.00	1.00	16.00
2872	FERTILIZER MIXING	3.00	3.00	5.00	5.00	3.00	3.00	22.00
2879	AGRICULTURAL PESTICIDES	3.00	3.00	5.00	5.00	3.00	1.00	20.00
2891	ADHESIVES AND GELATIN	1.00	3.00	5.00	5.00	3.00	0.00	17.00
2892	EXPLOSIVES	1.00	3.00	5.00	0.00	3.00	3.00	15.00
2893	PRINTING INK	3.00	3.00	5.00	5.00	3.00	0.00	19.00
2895	CARBON BLACK	3.00	3.00	3.00	3.00	3.00	5.00	20.00
2899	OTHER CHEMICALS	1.00	3.00	5.00	5.00	3.00	0.00	17.00
2911	PETROLEUM REFINING	1.00	5.00	3.00	1.00	0.00	1.00	11.00
2951	PAVING MIXTURES AND BLOCKS	1.00	5.00	1.00	5.00	0.00	1.00	13.00
2952	ASPHALT FELTS AND COATINGS	1.00	5.00	1.00	3.00	0.00	0.00	10.00
2992	LUBRICATING OILS + GREASES	5.00	5.00	1.00	5.00	0.00	0.00	16.00
2999	PETROLEUM COAL PRODUCTS NEC	1.00	5.00	1.00	5.00	0.00	0.00	12.00
3011	TIRES AND INNER TUBES	5.00	3.00	5.00	0.00	1.00	0.00	14.00
3021	RUBBER FOOTWEAR	5.00	5.00	1.00	0.00	1.00	1.00	13.00
3031	RECLAIMED RUBBER	1.00	5.00	1.00	3.00	1.00	0.00	11.00
3069	RUBBER PRODUCTS NEC	5.00	5.00	1.00	3.00	1.00	1.00	16.00
3079	MISC PLASTIC PRODUCTS	5.00	5.00	1.00	3.00	1.00	1.00	16.00
3111	LEATHER TANNING	5.00	5.00	1.00	3.00	1.00	1.00	16.00
3121	LEATHER FELTING AND PACKING	3.00	5.00	1.00	5.00	1.00	1.00	16.00
3131	FOOTWEAR CUTSTOCK	3.00	5.00	1.00	5.00	1.00	1.00	16.00
3141	SHOES MINUS RUBBER	3.00	5.00	1.00	1.00	1.00	3.00	14.00
3142	HOUSE SLIPPERS	3.00	5.00	1.00	3.00	1.00	1.00	14.00
3151	LEATHER GLOVES MITTENS	3.00	5.00	1.00	5.00	1.00	5.00	20.00
3161	LUGGAGE	3.00	5.00	1.00	3.00	1.00	0.00	13.00
3171	WOMENS HANDBAGS	3.00	5.00	1.00	5.00	1.00	0.00	15.00
3172	OTHER PERSONAL LEATHER GOODS	3.00	5.00	1.00	5.00	1.00	0.00	15.00
3199	LEATHER GOODS NEC	3.00	5.00	1.00	5.00	1.00	0.00	15.00
3211	FLAT GLASS	5.00	3.00	5.00	0.00	1.00	3.00	17.00
3221	GLASS CONTAINERS	5.00	5.00	1.00	0.00	1.00	3.00	15.00

TABLE A-3(continued)

3229	PRESSED AND BLOW GLASS	5.00	5.00	1.00	1.00	1.00	5.00	18.00
3231	PRODUCTS OF PURCHASED GLASS	5.00	5.00	1.00	5.00	1.00	1.00	18.00
3241	HYDRAULIC CEMENT	1.00	3.00	5.00	1.00	1.00	3.00	14.00
3251	BRICK + STRUCTURAL CLAY TILE	3.00	3.00	5.00	3.00	1.00	3.00	18.00
3253	CERAMIC WALL AND FLOOR TILE	3.00	3.00	5.00	3.00	1.00	1.00	16.00
3255	CLAY REFRACTORIES	5.00	3.00	5.00	3.00	1.00	5.00	22.00
3259	STRUCTURAL CLAY PRODUCTS NEC	3.00	3.00	5.00	3.00	1.00	5.00	20.00
3261	VITREOUS PLUMBING FIXTURES	5.00	3.00	5.00	1.00	1.00	3.00	18.00
3262	VITREOUS TABLE ARTICLES	3.00	3.00	5.00	1.00	1.00	3.00	16.00
3263	EARTHENWARE TABLE ARTICLES	3.00	3.00	5.00	0.00	1.00	1.00	13.00
3264	PORCELAIN ELECTRIC SUPPLIES	3.00	3.00	5.00	1.00	1.00	1.00	14.00
3269	POTTERY PRODUCTS NEC	3.00	3.00	5.00	5.00	1.00	1.00	18.00
3271	CONCRETE BLOCK AND BRICK	3.00	3.00	5.00	5.00	1.00	1.00	18.00
3272	OTHER CONCRETE PRODUCTS	3.00	3.00	5.00	5.00	1.00	1.00	18.00
3273	HEAVY-MIXED CONCRETE	1.00	3.00	5.00	5.00	1.00	5.00	20.00
3274	LIME	1.00	3.00	5.00	3.00	1.00	5.00	18.00
3275	GYPHUM PRODUCTS	5.00	3.00	5.00	3.00	1.00	3.00	20.00
3281	CUT STONE	1.00	3.00	5.00	5.00	1.00	5.00	20.00
3291	ABASIVE PRODUCTS	5.00	3.00	5.00	3.00	1.00	0.00	17.00
3292	ASBESTOS PRODUCTS	5.00	3.00	5.00	1.00	1.00	0.00	15.00
3293	GASKETS PACKING	5.00	3.00	5.00	3.00	1.00	0.00	17.00
3295	MINERALS GROUND OR TREATED	1.00	3.00	5.00	5.00	1.00	1.00	16.00
3296	MINERAL WOOD	5.00	3.00	5.00	3.00	1.00	3.00	20.00
3297	NONCLAY REFRACTORIES	1.00	3.00	5.00	3.00	1.00	1.00	14.00
3299	NONMETALLIC PRODUCTS NEC	5.00	3.00	5.00	5.00	1.00	1.00	20.00
3312	BLAST FURNACES STEEL WORKS	1.00	3.00	3.00	0.00	5.00	0.00	12.00
3313	ELECTROMETALLURGICAL PRODUCT	1.00	3.00	3.00	0.00	5.00	3.00	15.00
3315	STEEL WIRE DRAGING AND NAILS	5.00	3.00	3.00	3.00	5.00	0.00	19.00
3316	COLD ROLLED STEEL SHEET+BARS	5.00	3.00	3.00	1.00	5.00	5.00	22.00
3317	STEEL PIPE AND TUBES	5.00	3.00	3.00	1.00	5.00	0.00	17.00
3321	GRAY IRON FOUNDRIES	5.00	3.00	5.00	3.00	5.00	1.00	22.00
3322	MALLEABLE IRON FOUNDRIES	5.00	3.00	5.00	0.00	5.00	3.00	21.00
3323	STEEL FOUNDRIES	5.00	3.00	5.00	1.00	5.00	0.00	19.00
3331	PRIMARY COPPER PRODUCTION	1.00	1.00	3.00	0.00	5.00	1.00	11.00
3332	PRIMARY LEAD PRODUCTION	1.00	1.00	3.00	3.00	5.00	3.00	16.00
3333	PRIMARY ZINC PRODUCTION	1.00	1.00	3.00	0.00	5.00	5.00	15.00
3334	PRIMARY ALUMINUM PRODUCTION	1.00	1.00	3.00	0.00	5.00	3.00	13.00
3339	PRIMARY NONFERROUS PROD NEC	1.00	1.00	3.00	3.00	5.00	3.00	16.00
3341	SECONDARY NONFERROUS METAL	5.00	1.00	3.00	5.00	5.00	0.00	19.00
3351	COPPER ROLLING + DRAWING	1.00	3.00	1.00	0.00	5.00	0.00	10.00
3352	ALUMINUM ROLLING + DRAWING	5.00	3.00	1.00	0.00	5.00	1.00	15.00
3356	ROLLING DRAWING ETC	5.00	3.00	1.00	1.00	5.00	0.00	15.00
3357	NONFERROUS WIRE DRAWING	5.00	3.00	1.00	1.00	5.00	5.00	20.00
3361	ALUMINUM CASTINGS	5.00	5.00	1.00	5.00	5.00	1.00	22.00
3362	BRASS BRONZE+COPPER CASTING	5.00	5.00	1.00	5.00	5.00	1.00	22.00
3369	NONFERROUS CASTINGS NEC	5.00	5.00	1.00	3.00	5.00	1.00	20.00
3391	IRON AND STEEL FORGINGS	5.00	3.00	5.00	1.00	5.00	0.00	19.00
3399	PRIMARY METAL PRODUCTS NEC	1.00	3.00	5.00	5.00	5.00	0.00	19.00
3411	METAL CANS	3.00	5.00	1.00	1.00	0.00	0.00	10.00
3421	CUTLERY	5.00	5.00	1.00	3.00	0.00	1.00	15.00
3423	HAND EDGE TOOLS PLUS SAWS	5.00	5.00	1.00	3.00	0.00	1.00	15.00
3425	HAND SAWS AND SAW BLADES	5.00	5.00	1.00	3.00	0.00	1.00	15.00
3429	HARDWARE NEC	5.00	5.00	1.00	3.00	0.00	0.00	14.00
3431	IRON METAL SANITARY WARE	5.00	5.00	1.00	3.00	0.00	1.00	15.00
3432	BRASS PLUMBING FITTINGS	5.00	5.00	1.00	3.00	0.00	1.00	15.00
3433	NONELECTRIC HEATING EQUIP	5.00	5.00	1.00	3.00	0.00	1.00	15.00

TABLE A-3.(continued)

3441	FABRICATED STRUCTURAL STEEL	5.00	5.00	1.00	3.00	0.00	0.00	14.00
3442	METAL DOORS SASH + FRAMES	5.00	5.00	1.00	5.00	0.00	0.00	16.00
3443	FABRICATED PLATE WORK	3.00	5.00	1.00	3.00	0.00	0.00	12.00
3444	SHEET METAL WORK	5.00	5.00	1.00	5.00	0.00	0.00	16.00
3446	ARCHITECTURAL METAL WORK	3.00	5.00	1.00	5.00	0.00	0.00	14.00
3449	MISCELLANEOUS METAL WORK	3.00	5.00	1.00	3.00	0.00	5.00	17.00
3451	SCREW MACHINE PRODUCTS	3.00	5.00	0.00	5.00	0.00	0.00	13.00
3452	BOLTS NUTS SCREWS + WASHERS	3.00	5.00	0.00	3.00	0.00	0.00	11.00
3461	METAL STAMPINGS	5.00	5.00	1.00	3.00	0.00	0.00	14.00
3471	ELECTROPLATING	1.00	5.00	1.00	5.00	0.00	0.00	12.00
3479	COATING ENGRAVING ETC	5.00	5.00	1.00	5.00	0.00	0.00	16.00
3481	MISC FABRICATED PIPE PRODUCT	5.00	5.00	1.00	5.00	0.00	0.00	16.00
3491	METAL SHIPPING BARRELS+KEGS	5.00	5.00	1.00	3.00	0.00	0.00	14.00
3492	SAFES AND VAULTS	3.00	5.00	1.00	3.00	0.00	0.00	12.00
3493	STEEL SPRINGS	5.00	5.00	1.00	3.00	0.00	0.00	14.00
3494	VALVES PIPE FITTINGS	5.00	5.00	1.00	3.00	0.00	0.00	14.00
3496	COLLAPSIBLE TUBES	3.00	5.00	1.00	1.00	0.00	1.00	11.00
3497	METAL FOIL AND LEAF	5.00	5.00	1.00	3.00	0.00	0.00	14.00
3498	FABRICATED PIPES + FITTINGS	5.00	5.00	1.00	5.00	0.00	0.00	16.00
3499	FABRICATED METAL PRODUCT NEC	5.00	5.00	1.00	5.00	0.00	1.00	17.00
3511	STEAM ENGINES AND TURBINES	1.00	3.00	5.00	0.00	0.00	0.00	9.00
3519	INTERNAL COMBUSTION ENGINE NEC	5.00	3.00	5.00	0.00	0.00	0.00	13.00
3522	FARM MACHINERY AND EQUIPMENT	5.00	3.00	5.00	3.00	0.00	1.00	17.00
3531	CONSTRUCTION MACHINERY	5.00	3.00	5.00	1.00	0.00	1.00	15.00
3532	MINING MACHINERY + EQUIPMENT	3.00	3.00	5.00	3.00	0.00	1.00	15.00
3533	OIL FIELD MACHINERY + EQUIP	5.00	3.00	5.00	3.00	0.00	1.00	17.00
3534	ELEVATORS	3.00	3.00	5.00	3.00	0.00	0.00	14.00
3535	CONVEYORS	3.00	3.00	5.00	3.00	0.00	1.00	15.00
3536	HOISTS CRANES + MONORAILS	5.00	3.00	5.00	3.00	0.00	5.00	21.00
3537	INDUSTRIAL TRUCKS + TRACTORS	3.00	3.00	5.00	3.00	0.00	1.00	15.00
3541	METAL CUTTING MACHINE TOOLS	3.00	5.00	1.00	3.00	0.00	0.00	12.00
3542	METAL FORMING MACHINE TOOLS	3.00	5.00	1.00	3.00	0.00	0.00	12.00
3544	SPECIAL UTES TOOLS YGT SETS	5.00	5.00	1.00	5.00	0.00	0.00	16.00
3545	MACHINE TOOL ACCESSORIES	3.00	5.00	1.00	3.00	0.00	0.00	12.00
3548	METALWORKING MACHINERY	5.00	5.00	1.00	3.00	0.00	0.00	14.00
3551	FOOD PRODUCTS MACHINERY	3.00	5.00	1.00	3.00	0.00	1.00	13.00
3552	TEXTILE MACHINERY	5.00	5.00	1.00	3.00	0.00	0.00	14.00
3553	WOODWORKING MACHINERY	5.00	5.00	1.00	3.00	0.00	1.00	15.00
3554	PAPER INDUSTRIES MACHINERY	3.00	5.00	1.00	3.00	0.00	0.00	12.00
3555	PRINTING TRADES MACHINERY	3.00	5.00	1.00	3.00	0.00	0.00	12.00
3559	SPECIAL INDUSTRY MACHINERY NEC	5.00	5.00	1.00	3.00	0.00	1.00	15.00
3561	PUMPS AND COMPRESSORS	3.00	5.00	1.00	3.00	0.00	1.00	13.00
3562	BALL AND ROLLER BEARINGS	5.00	5.00	1.00	0.00	0.00	1.00	12.00
3564	BLOWERS AND FANS	3.00	5.00	1.00	3.00	0.00	0.00	12.00
3565	INDUSTRIAL PATTERNS	3.00	5.00	1.00	5.00	0.00	0.00	14.00
3566	POWER TRANSMISSION EQUIPMENT	5.00	5.00	1.00	3.00	0.00	0.00	14.00
3567	INDUSTRIAL FURNACES + OVENS	3.00	5.00	1.00	3.00	0.00	0.00	12.00
3569	OTHER INDUSTRIAL MACHINERY	5.00	5.00	1.00	3.00	0.00	0.00	14.00
3572	TYPEWRITERS	3.00	5.00	1.00	0.00	0.00	3.00	12.00
3573	ELECTRONIC COMPUTING EQUIP	5.00	5.00	1.00	0.00	0.00	0.00	11.00
3574	CALCULATING + ACCTG MACHINES	3.00	5.00	1.00	0.00	0.00	0.00	9.00
3576	SCALES AND BALANCES	3.00	5.00	1.00	3.00	0.00	1.00	13.00
3579	OTHER OFFICE MACHINES	3.00	5.00	1.00	3.00	0.00	0.00	12.00
3581	AUTOMATIC VENDING MACHINES	3.00	5.00	1.00	3.00	0.00	0.00	12.00
3582	COMMERCIAL LAUNDRY EQUIPMENT	3.00	5.00	1.00	3.00	0.00	1.00	13.00
3585	REFRIGERATION EQUIPMENT	5.00	5.00	1.00	3.00	0.00	1.00	15.00

TABLE A-3.(continued)

3586	MEASURING & DISPENSING PUMPS	3.00	5.00	1.00	3.00	0.00	1.00	13.00
3589	SEWAGE DISPOSAL MACHINES/NEC	3.00	5.00	1.00	5.00	0.00	0.00	14.00
3594	WISC MACHINERY PARTS ELECT	5.00	5.00	0.00	5.00	0.00	5.00	20.00
3611	ELECTRIC MEASURING EQUIPMENT	3.00	5.00	1.00	3.00	0.00	0.00	12.00
3612	POWER TRANSFORMERS	5.00	5.00	1.00	1.00	0.00	0.00	12.00
3613	SWITCHGEAR SWITCHBOARD EQUIP	5.00	5.00	1.00	3.00	0.00	0.00	14.00
3621	MOTORS AND GENERATORS	5.00	5.00	1.00	0.00	0.00	0.00	11.00
3622	INDUSTRIAL CONTROLS	5.00	5.00	1.00	3.00	0.00	0.00	14.00
3623	MELTING APPARATUS	3.00	5.00	1.00	3.00	0.00	0.00	12.00
3624	CANNON & GRAPHITE PRODUCTS	5.00	5.00	1.00	1.00	0.00	3.00	15.00
3629	ELECTRICAL AND APPARATUS NEC	5.00	5.00	1.00	3.00	0.00	1.00	15.00
3631	HOUSEHOLD COOKING EQUIPMENT	3.00	1.00	3.00	0.00	0.00	1.00	8.00
3632	HOUSEHOLD REFRIGERATORS	5.00	1.00	3.00	0.00	0.00	1.00	10.00
3633	HOUSEHOLD LAUNDRY EQUIPMENT	5.00	1.00	3.00	0.00	0.00	3.00	12.00
3634	ELECTRIC HOUSEWARES & FANS	5.00	1.00	3.00	1.00	0.00	1.00	11.00
3635	HOUSEHOLD VACUUM CLEANERS	3.00	1.00	3.00	0.00	0.00	0.00	7.00
3636	SEWING MACHINES	3.00	1.00	3.00	3.00	0.00	0.00	10.00
3639	HOUSEHOLD APPLIANCES NEC	5.00	1.00	3.00	1.00	0.00	0.00	10.00
3641	ELECTRIC LAMPS	3.00	5.00	1.00	0.00	0.00	1.00	10.00
3642	LIGHTING FIXTURES	5.00	5.00	1.00	3.00	0.00	1.00	15.00
3643	CURRENT-CARRYING WIRING EQUI	5.00	5.00	1.00	3.00	0.00	1.00	15.00
3644	NONCURRENT-CARRYING WIRING/EQ	5.00	5.00	1.00	3.00	0.00	5.00	19.00
3651	RADIO TV RECEIVING SETS	3.00	5.00	1.00	0.00	0.00	0.00	9.00
3652	PHONOGRAPH RECORDS	5.00	5.00	1.00	5.00	0.00	0.00	16.00
3661	TELEPHONE & TELEGRAPH EQUIP	3.00	5.00	5.00	0.00	0.00	0.00	13.00
3662	RADIO TV TRANSMITTING EQUIP	3.00	5.00	5.00	0.00	0.00	0.00	13.00
3671	ELECTRON TUNES RECEIVING	3.00	5.00	1.00	0.00	0.00	1.00	10.00
3672	CATHODE RAY PICTURE TUBES	5.00	5.00	1.00	0.00	0.00	5.00	16.00
3673	ELECTRON TUNES TRANSMITTING	5.00	5.00	1.00	0.00	0.00	1.00	12.00
3674	SEMICONDUCTORS	5.00	5.00	1.00	0.00	0.00	5.00	16.00
3679	ELECTRONIC COMPONENTS NEC	5.00	5.00	1.00	3.00	0.00	5.00	19.00
3691	STORAGE BATTERIES	5.00	5.00	1.00	3.00	0.00	0.00	14.00
3692	PRIMARY BATTERIES-WET AND DRY	3.00	5.00	1.00	1.00	0.00	3.00	13.00
3694	ELECTRICAL EQ FOR ENGINES	5.00	5.00	1.00	1.00	0.00	0.00	12.00
3699	ELECTRICAL EQUIPMENT NEC	3.00	5.00	1.00	5.00	0.00	0.00	14.00
3711	MOTOR VEHICLES	5.00	1.00	3.00	0.00	1.00	0.00	10.00
3712	PASSENGER CAR BODIES	3.00	1.00	3.00	0.00	1.00	5.00	13.00
3713	TRUCK AND BUS BODIES	3.00	3.00	5.00	5.00	1.00	3.00	20.00
3714	MOTOR VEHICLE PARTS	5.00	1.00	3.00	1.00	1.00	0.00	11.00
3715	TRUCK TRAILERS	5.00	3.00	5.00	3.00	1.00	0.00	17.00
3721	AIRCRAFT	3.00	5.00	5.00	0.00	1.00	0.00	14.00
3722	AIRCRAFT ENGINES & PARTS	5.00	5.00	5.00	0.00	1.00	0.00	16.00
3723	AIRCRAFT PROPELLERS & PARTS	3.00	5.00	5.00	0.00	1.00	3.00	17.00
3729	AIRCRAFT PARTS & EQ NEC	5.00	5.00	5.00	1.00	1.00	0.00	17.00
3731	SHIP BUILDING AND REPAIRING	5.00	5.00	1.00	0.00	1.00	0.00	12.00
3732	BOAT BUILDING AND REPAIRING	3.00	5.00	1.00	5.00	1.00	3.00	18.00
3741	LOCOMOTIVES AND PARTS	3.00	3.00	5.00	0.00	1.00	0.00	12.00
3742	RAILROAD AND STREETCARS	3.00	3.00	5.00	0.00	1.00	0.00	12.00
3751	MOTORCYCLES BICYCLES & PARTS	3.00	3.00	5.00	3.00	1.00	0.00	15.00
3791	TRAILER CHACHES	3.00	3.00	5.00	3.00	1.00	3.00	18.00
3799	TRANSPORTATION EQUIPMENT NEC	3.00	3.00	5.00	5.00	1.00	1.00	18.00
3811	LABORATORY RESEARCH EQUIPMEN	3.00	5.00	1.00	3.00	1.00	0.00	13.00
3821	MECH MEASURING DEVICES	5.00	5.00	1.00	3.00	1.00	0.00	15.00
3822	AUTOMAT TEMPERATURE CONTROLS	3.00	5.00	1.00	0.00	1.00	0.00	10.00
3831	OPTICAL INSTRUMENTS & LENSES	3.00	5.00	1.00	3.00	1.00	0.00	13.00
3841	SURGICAL & MEDICAL INSTRUMEN	3.00	5.00	1.00	3.00	1.00	0.00	13.00

TABLE A-3.(continued)

3842	SURGICAL APPLIANCES + SUPPLY	5.00	5.00	1.00	5.00	1.00	0.00	17.00
3843	DENTAL EQUIP AND SUPPLIES	3.00	5.00	1.00	5.00	1.00	0.00	15.00
3851	OPHTHALMIC GOODS	5.00	5.00	1.00	3.00	1.00	1.00	16.00
3861	PHOTOGRAPHIC EQUIP + SUPPLY	5.00	5.00	1.00	1.00	1.00	0.00	13.00
3871	WATCHES CLOCKS AND PARTS	5.00	5.00	1.00	1.00	1.00	1.00	14.00
3872	WATCHCASES	3.00	5.00	1.00	3.00	1.00	0.00	13.00
3911	JEWELRY PRECIOUS METAL	3.00	3.00	5.00	5.00	1.00	0.00	17.00
3912	JEWELERS FINDINGS + MATERIAL	3.00	3.00	5.00	5.00	1.00	0.00	17.00
3913	LAPIDARY WORK	3.00	3.00	5.00	5.00	1.00	0.00	17.00
3914	SILVERWARE + PLATED WARE	5.00	3.00	5.00	3.00	1.00	3.00	20.00
3931	MUSICAL INSTRUMENTS	3.00	5.00	1.00	3.00	1.00	1.00	14.00
3941	GAMES + TOYS MINUS DOLLS	5.00	3.00	5.00	3.00	1.00	0.00	17.00
3942	DOLLS	3.00	3.00	5.00	5.00	1.00	0.00	17.00
3943	CHILDRENS VEHICLES	3.00	3.00	5.00	3.00	1.00	1.00	16.00
3949	SPORTING GOODS NEC	3.00	3.00	5.00	5.00	1.00	1.00	18.00
3951	PENS POINTS + MECH PENCILS	3.00	5.00	1.00	3.00	1.00	1.00	14.00
3952	PENCILS CRAYONS ARTIST MATLS	3.00	5.00	1.00	3.00	1.00	1.00	14.00
3953	MARKING DEVICES	3.00	5.00	1.00	5.00	1.00	0.00	15.00
3955	CARBON PAPER + INKED RIBBON	3.00	5.00	1.00	3.00	1.00	0.00	13.00
3951	COSTUME JEWELRY + NOVELTIES	5.00	3.00	5.00	5.00	1.00	0.00	19.00
3962	FEATHERS ARTIFICIAL FLOWERS	3.00	3.00	5.00	5.00	1.00	0.00	17.00
3963	BUTTONS	3.00	3.00	5.00	5.00	1.00	1.00	18.00
3964	NEEDLES PINS HOOKS + EYES	5.00	3.00	5.00	3.00	1.00	1.00	18.00
3991	BROOMS AND BRUSHES	3.00	5.00	1.00	5.00	1.00	0.00	15.00
3993	SIGNS + ADVERTISING DISPLAYS	3.00	5.00	1.00	5.00	1.00	0.00	15.00
3994	MORTICIANS GOODS	3.00	5.00	1.00	5.00	1.00	1.00	16.00
3996	LINOLEUM+FLOR COVERING NEC	3.00	5.00	1.00	0.00	1.00	0.00	10.00
3999	MANUFACTURING INDUSTRIES NEC	5.00	5.00	1.00	5.00	1.00	0.00	17.00

TABLE A-4.
MAYELLE SCREENING MATRIX

DELAWARE - LOWER REGION

CRITERIA USED

- 1 WATER INTAKE PER EMPLOYEE PER YEAR
- 2 PERCENT OF TOTAL SHIPMENTS BY RAIL
- 3 PERCENT OF TOTAL SHIPMENTS BY TRUCK(HIGHWAY)
- 4 AVERAGE HOURLY EARNINGS OF PRODUCTION WORKERS
- 5 AVERAGE NUMBER OF EMPLOYEES PER ESTABLISHMENT
- 6 PERCENT LABORERS IN THE INDUSTRY

2011 MEAT PACKING	5.00	1.00	1.00	3.00	3.00	3.00	16.00
2013 SAUSAGES	5.00	0.00	1.00	3.00	5.00	3.00	17.00
2015 POULTRY	5.00	0.00	1.00	5.00	3.00	3.00	17.00
2021 CREAMERY BUTTER	1.00	1.00	3.00	3.00	5.00	3.00	16.00
2022 CHEESE	5.00	1.00	3.00	3.00	5.00	3.00	20.00
2023 CONDENSED MILK	1.00	1.00	3.00	3.00	5.00	3.00	16.00
2024 ICE CREAM	5.00	1.00	3.00	3.00	5.00	3.00	20.00
2026 FLUID MILK	5.00	1.00	3.00	3.00	5.00	3.00	20.00
2031 CANNED FISH	5.00	1.00	3.00	3.00	0.00	3.00	15.00
2032 CANNED SPECIALTIES	5.00	1.00	3.00	3.00	1.00	3.00	16.00
2033 CANNED FRUITS VEGETABLES JAM	5.00	1.00	3.00	3.00	3.00	3.00	18.00
2034 DRIED FRUITS	5.00	1.00	3.00	3.00	3.00	3.00	18.00
2035 PICKLED FRUITS VEGETABLES	5.00	1.00	3.00	3.00	5.00	3.00	20.00
2036 FRESH OR FROZEN FISH	5.00	1.00	3.00	5.00	5.00	3.00	22.00
2037 FROZEN FRUITS JUICES	1.00	1.00	3.00	3.00	3.00	3.00	14.00
2041 FLOUR AND GRAIN PRODUCTS	5.00	3.00	5.00	3.00	5.00	3.00	24.00
2042 PREPARED FEEDS FOR ANIMAL	5.00	3.00	5.00	3.00	5.00	3.00	24.00
2043 CEREAL PREPARATIONS	5.00	3.00	5.00	1.00	0.00	3.00	17.00
2044 RICE MILLING	3.00	3.00	5.00	3.00	3.00	3.00	20.00
2045 PREPARED FLOUR	3.00	3.00	5.00	3.00	3.00	3.00	20.00
2046 WET CORN MILLING	1.00	3.00	5.00	1.00	0.00	3.00	13.00
2051 BREAD AND BAKERY PRODUCTS	3.00	3.00	5.00	3.00	3.00	3.00	20.00
2052 COOKIES AND CRACKERS	5.00	3.00	5.00	3.00	3.00	3.00	22.00
2061 CANE SUGAR MINUS REFINING	1.00	3.00	5.00	3.00	3.00	3.00	18.00
2062 CANE SUGAR REFINING	1.00	3.00	5.00	1.00	0.00	3.00	13.00
2063 BEET SUGAR	1.00	3.00	5.00	3.00	1.00	3.00	16.00
2071 CANDY PRODUCTS	5.00	0.00	1.00	3.00	3.00	3.00	15.00
2072 CHOCOLATE PRODUCTS	3.00	0.00	1.00	3.00	1.00	3.00	11.00
2073 CHEWING GUM	3.00	0.00	1.00	3.00	0.00	3.00	10.00
2082 MALT LIQUORS	1.00	1.00	3.00	1.00	0.00	3.00	9.00
2083 MALT	1.00	1.00	3.00	1.00	5.00	3.00	14.00
2084 WINES AND BRANDY	1.00	1.00	3.00	3.00	5.00	3.00	16.00
2085 DISTILLED BLENDED LIQUORS	1.00	1.00	3.00	3.00	1.00	3.00	12.00
2086 BOTTLED CANNED SOFT DRINKS	5.00	0.00	0.00	3.00	5.00	3.00	16.00
2087 FLAVORING EXTRACTS SIRUPS	5.00	0.00	0.00	3.00	5.00	3.00	16.00
2091 COTTONSEED OIL MILLS	3.00	1.00	5.00	5.00	5.00	3.00	22.00
2092 SOYBEAN OIL MILLS	1.00	1.00	5.00	3.00	3.00	3.00	16.00
2093 OTHER VEGETABLE OIL MILLS	1.00	1.00	5.00	3.00	5.00	3.00	18.00
2094 ANIMAL FATS OILS	1.00	0.00	1.00	3.00	5.00	3.00	13.00
2095 ROASTED COFFEE	5.00	1.00	5.00	3.00	3.00	3.00	20.00
2096 SHORTENING MARGARINE	1.00	1.00	5.00	3.00	3.00	3.00	16.00
2097 MANUFACTURED ICE	1.00	1.00	5.00	3.00	5.00	3.00	18.00
2098 MACARONI SPAGHETTI NOODLES	3.00	1.00	5.00	3.00	5.00	3.00	20.00
2099 FOOD PREPARATIONS	1.00	1.00	5.00	3.00	5.00	3.00	18.00

TABLE A-4.(continued)

2111	CIGARETTES	5.00	1.00	3.00	3.00	0.00	1.00	13.00
2121	CIGARS	3.00	1.00	3.00	5.00	3.00	1.00	16.00
2131	TOBACCO AND SNUFF	3.00	1.00	3.00	3.00	3.00	1.00	14.00
2141	TOBACCO STEMMING REDRYING	3.00	1.00	3.00	5.00	3.00	1.00	16.00
2211	BROAD WOVEN COTTON FABRIC	5.00	0.00	0.00	3.00	0.00	1.00	9.00
2221	BROAD WOVEN MANMADE FIBER	5.00	0.00	0.00	3.00	0.00	1.00	9.00
2231	BROAD WOVEN WOOL FABRICS	5.00	0.00	0.00	3.00	3.00	1.00	12.00
2241	NARROW FABRICS	5.00	0.00	0.00	3.00	3.00	1.00	12.00
2251	WOMENS HOSIERY	5.00	0.00	1.00	5.00	1.00	1.00	13.00
2252	OTHER HOSIERY	5.00	0.00	1.00	5.00	3.00	1.00	15.00
2253	KNIT OUTERWARE MILLS	5.00	0.00	1.00	3.00	3.00	1.00	13.00
2254	KNIT UNDERWARE MILLS	5.00	0.00	1.00	5.00	0.00	1.00	12.00
2256	KNIT FABRIC MILLS	5.00	0.00	0.00	3.00	3.00	1.00	12.00
2259	OTHER KNITTING MILLS	3.00	0.00	1.00	3.00	5.00	1.00	13.00
2261	COTTON FINISHERS	1.00	0.00	0.00	3.00	1.00	1.00	6.00
2262	MANMADE FIBER SILK FINISHERS	1.00	0.00	0.00	3.00	3.00	1.00	8.00
2269	OTHER TEXTILE FINISHERS	5.00	0.00	0.00	3.00	3.00	1.00	12.00
2271	WOVEN CARPETS AND RUGS	3.00	0.00	0.00	3.00	3.00	1.00	10.00
2272	TUFTED CARPETS AND RUGS	5.00	0.00	0.00	3.00	3.00	1.00	12.00
2279	OTHER CARPETS AND RUGS	3.00	0.00	0.00	3.00	5.00	1.00	12.00
2281	YARN SPINNING MILLS	5.00	0.00	0.00	5.00	1.00	1.00	12.00
2282	YARN THROWING TWISTING MILLS	5.00	0.00	0.00	5.00	3.00	1.00	14.00
2283	WOOL YARN MILLS	5.00	0.00	0.00	3.00	3.00	1.00	12.00
2284	THREAD MILLS	5.00	0.00	0.00	3.00	1.00	1.00	10.00
2291	FELT GOODS MINUS WOVEN FELTS	5.00	0.00	0.00	3.00	3.00	1.00	12.00
2292	LACE GOODS	3.00	0.00	0.00	3.00	5.00	1.00	12.00
2293	PAUDINGS UPHOLSTERY FILLINGS	3.00	0.00	0.00	3.00	5.00	1.00	12.00
2294	PROCESSED WASTE	3.00	0.00	0.00	5.00	5.00	1.00	14.00
2295	ARTIFICIAL LEATHER OILCLOTH	5.00	0.00	0.00	3.00	3.00	1.00	12.00
2296	TIRE CORU AND FABRIC	3.00	0.00	0.00	3.00	0.00	1.00	7.00
2297	WOOL SCOURING AND WORSTED	5.00	0.00	0.00	3.00	3.00	1.00	12.00
2298	CORDAGE AND TWINE	1.00	0.00	0.00	3.00	3.00	1.00	8.00
2299	OTHER TEXTILE GOODS	5.00	0.00	0.00	3.00	5.00	1.00	14.00
2311	MENS BOYS SUITS AND COATS	3.00	0.00	1.00	3.00	3.00	1.00	11.00
2321	MENS BOYS SHIRTS AND COLLARS	3.00	0.00	1.00	5.00	3.00	1.00	13.00
2322	MENS BOYS UNDERWEAR	3.00	0.00	1.00	5.00	1.00	1.00	11.00
2323	MENS BOYS NECKWEAR	3.00	0.00	1.00	3.00	5.00	1.00	13.00
2327	MENS BOYS SEPARATE TROUSERS	3.00	0.00	1.00	5.00	3.00	1.00	13.00
2328	MENS BOYS WORK CLOTHING	3.00	0.00	1.00	5.00	1.00	1.00	11.00
2329	OTHER MENS BOYS CLOTHING	3.00	0.00	1.00	5.00	3.00	1.00	13.00
2331	WOMENS MISSES BLOUSES SHIRTS	3.00	0.00	1.00	5.00	3.00	1.00	13.00
2335	WOMENS MISSES DRESSES	3.00	0.00	1.00	3.00	5.00	1.00	13.00
2337	WOMENS MISSES SKIRTS COATS	3.00	0.00	1.00	3.00	5.00	1.00	13.00
2339	OTHER WOMEN MISSES OUTERWARE	3.00	0.00	1.00	5.00	3.00	1.00	13.00
2341	WOMENS UNDERWARE NIGHTWARE	3.00	0.00	1.00	5.00	3.00	1.00	13.00
2342	CORSETS	3.00	0.00	1.00	5.00	3.00	1.00	13.00
2351	MILLINERY	3.00	0.00	1.00	3.00	5.00	1.00	13.00
2352	HATS AND CAPS	3.00	0.00	1.00	5.00	5.00	1.00	15.00
2361	CHILDRENS DRESSES BLOUSES	3.00	0.00	1.00	5.00	3.00	1.00	13.00
2363	CHILDRENS COATS SUITS	3.00	0.00	1.00	5.00	5.00	1.00	15.00
2369	OTHER CHILDRENS OUTERWARE	3.00	0.00	1.00	5.00	3.00	1.00	13.00
2371	FUR GOODS	3.00	0.00	1.00	1.00	5.00	1.00	11.00
2381	DRESS AND WORK GLOVES	3.00	0.00	1.00	5.00	3.00	1.00	13.00
2384	ROBES AND DRESSING GOWNS	3.00	0.00	1.00	5.00	5.00	1.00	15.00
2385	RAINCOATS	3.00	0.00	1.00	5.00	3.00	1.00	13.00
2386	LEATHER CLOTHING	3.00	0.00	1.00	3.00	5.00	1.00	13.00

TABLE A-4.(continued)

2387	APPAREL BELTS	3.00	0.00	1.00	5.00	5.00	1.00	15.00
2389	OTHER APPAREL + ACCESSORIES	3.00	0.00	1.00	5.00	5.00	1.00	15.00
2391	CURTAINS AND DRAPERIES	3.00	0.00	1.00	5.00	5.00	1.00	15.00
2392	OTHER HOUSEFURNISHINGS	3.00	0.00	1.00	5.00	5.00	1.00	15.00
2393	TEXTILE BAGS	3.00	0.00	1.00	5.00	5.00	1.00	15.00
2394	CANVAS	3.00	0.00	1.00	3.00	5.00	1.00	13.00
2395	PLEATING + NOVELTY STITCHING	3.00	0.00	1.00	3.00	5.00	1.00	13.00
2396	AUTOMOTIVE TRIMMINGS	3.00	0.00	1.00	3.00	5.00	1.00	13.00
2397	SCHIFFLI EMBROIDERIES	3.00	0.00	1.00	3.00	5.00	1.00	13.00
2399	OTHER FABRICATED TEXTILES	3.00	0.00	1.00	5.00	5.00	1.00	15.00
2411	LOGGING CAMPS CONTRACTORS	3.00	1.00	3.00	3.00	5.00	1.00	16.00
2421	SAWMILLS PLANING MILLS	3.00	1.00	3.00	3.00	5.00	1.00	16.00
2426	HARDWOOD DIMENSION MILLS	3.00	1.00	3.00	5.00	5.00	1.00	18.00
2429	SPECIAL PRODUCT SAWMILLS	3.00	1.00	3.00	3.00	5.00	1.00	16.00
2431	MILLWORK	3.00	3.00	5.00	3.00	5.00	1.00	20.00
2432	VEENER AND PLYWOOD	1.00	3.00	5.00	3.00	3.00	1.00	16.00
2433	PREFAB WOODEN BLDGS	3.00	3.00	5.00	3.00	5.00	1.00	20.00
2441	WOODEN BOXES	3.00	1.00	3.00	3.00	5.00	1.00	16.00
2442	WIREBOUND BOXES CRATES	3.00	1.00	3.00	5.00	3.00	1.00	16.00
2443	VEENER PLYWOOD CONTAINERS	3.00	1.00	3.00	5.00	5.00	1.00	18.00
2445	COOPERAGE	3.00	1.00	3.00	3.00	5.00	1.00	16.00
2491	WOOD PRESERVING	5.00	1.00	3.00	3.00	5.00	1.00	18.00
2499	WOOD PRODUCTS	1.00	1.00	3.00	3.00	5.00	1.00	14.00
2511	WOOD HOUSEHOLD FURNITURE	3.00	0.00	1.00	3.00	3.00	1.00	11.00
2512	UPHOLSTERED WOOD HSHLD FURN	3.00	0.00	1.00	3.00	5.00	1.00	13.00
2514	METAL HOUSEHOLD FURNITURE	3.00	0.00	1.00	3.00	3.00	1.00	11.00
2515	MATRESSES AND BEDSPRINGS	3.00	0.00	1.00	3.00	5.00	1.00	13.00
2519	OTHER HOUSEHOLD FURNITURE	3.00	0.00	1.00	3.00	5.00	1.00	13.00
2521	WOOD OFFICE FURNITURE	3.00	0.00	1.00	3.00	5.00	1.00	13.00
2522	METAL OFFICE FURNITURE	3.00	0.00	1.00	3.00	3.00	1.00	11.00
2531	PUBLIC BLDG FURNITURE	3.00	0.00	1.00	3.00	3.00	1.00	11.00
2541	WOOD PARTITIONS + SHELVING	3.00	0.00	1.00	3.00	5.00	1.00	13.00
2542	METAL PARTITIONS + SHELVING	3.00	0.00	1.00	3.00	5.00	1.00	13.00
2591	VENETIAN BLINDS + SHADES	3.00	0.00	1.00	3.00	5.00	1.00	13.00
2599	OTHER FURNITURE + FIXTURES	3.00	0.00	1.00	3.00	5.00	1.00	13.00
2611	PULP MILLS	1.00	3.00	5.00	1.00	1.00	1.00	12.00
2621	PAPER MILLS	1.00	3.00	5.00	3.00	0.00	1.00	13.00
2631	PAPERBOARD MILLS	1.00	3.00	5.00	3.00	1.00	1.00	14.00
2641	PAPER COATING AND GLAZING	3.00	1.00	3.00	3.00	3.00	1.00	16.00
2642	ENVELOPES	3.00	1.00	3.00	3.00	3.00	1.00	14.00
2643	BAGS MINUS TEXTILE BAGS	5.00	1.00	3.00	3.00	3.00	1.00	16.00
2644	WALLPAPER	3.00	1.00	3.00	3.00	5.00	1.00	16.00
2645	DIE CUT PAPER + CARDBOARD	3.00	1.00	3.00	3.00	5.00	1.00	16.00
2646	PRESSED MOLDED PULP GOODS	1.00	1.00	3.00	3.00	3.00	1.00	12.00
2647	SANITARY PAPER	5.00	1.00	3.00	3.00	1.00	1.00	14.00
2649	OTHER PAPERBOARD	5.00	1.00	3.00	3.00	3.00	1.00	16.00
2651	FOLDING PAPERBOARD BOXES	5.00	0.00	1.00	3.00	3.00	1.00	13.00
2652	SET-UP PAPERBOARD BOXES	3.00	0.00	1.00	3.00	5.00	1.00	13.00
2653	CORRUGATED FIBER BOXES	3.00	0.00	1.00	3.00	3.00	1.00	11.00
2654	SANITARY FOOD CONTAINERS	5.00	0.00	1.00	3.00	3.00	1.00	13.00
2655	FIBER CANS TUBES DRUMS	3.00	0.00	1.00	3.00	3.00	1.00	11.00
2661	BUILDING PAPER	1.00	3.00	5.00	3.00	3.00	1.00	16.00
2711	NEWSPAPER PUBLISHING + PRINT	3.00	1.00	3.00	1.00	5.00	1.00	14.00
2721	PERIODICAL PUBLISHING + PRINT	3.00	1.00	3.00	3.00	5.00	1.00	16.00
2731	BOOKS PUBLISHING + PRINTING	3.00	1.00	3.00	3.00	3.00	1.00	14.00
2732	BOOK PRINTING	3.00	1.00	3.00	3.00	3.00	1.00	14.00

TABLE A-4.(continued)

2741	OTHER PUBLISHING	3.00	1.00	3.00	3.00	5.00	1.00	16.00
2751	COMMERCIAL PRINTING	3.00	0.00	1.00	3.00	5.00	1.00	13.00
2752	LITHOGRAPHIC PRINTING	3.00	0.00	1.00	3.00	5.00	1.00	13.00
2753	ENGRAVING	3.00	0.00	1.00	3.00	5.00	1.00	13.00
2761	MANIFOLD BUSINESS FORMS	3.00	1.00	3.00	3.00	3.00	1.00	14.00
2771	GREETING CARDS	3.00	1.00	3.00	3.00	3.00	1.00	14.00
2782	FLANKBOUNDS-LOOSE LEAF BINDER	3.00	1.00	3.00	3.00	3.00	1.00	14.00
2791	TYPESETTING	3.00	0.00	1.00	1.00	5.00	1.00	11.00
2793	PHOTOENGRAVING	3.00	0.00	1.00	1.00	5.00	1.00	11.00
2794	ELECTROTYPING STEROTYPING	3.00	0.00	1.00	1.00	5.00	1.00	11.00
2812	ALKALIES AND CHLORINE	1.00	1.00	5.00	1.00	0.00	3.00	11.00
2813	INDUSTRIAL GASES	1.00	1.00	5.00	3.00	5.00	3.00	18.00
2815	DYES CYCLIC CRUDE	1.00	1.00	5.00	1.00	1.00	3.00	12.00
2816	INORGANIC PIGMENTS	1.00	1.00	5.00	1.00	3.00	3.00	14.00
2818	ORGANIC CHEMICALS NEC	1.00	1.00	5.00	1.00	1.00	3.00	12.00
2819	INORGANIC CHEMICALS NEC	1.00	1.00	5.00	1.00	3.00	3.00	14.00
2821	PLASTICS MATERIALS + RESINS	1.00	1.00	3.00	3.00	3.00	3.00	14.00
2822	SYNTHETIC RUBBER	1.00	1.00	3.00	1.00	0.00	3.00	9.00
2823	CELLULOSIC MAN-MADE FIBERS	1.00	1.00	3.00	3.00	0.00	3.00	11.00
2824	SYNTHETIC ORGANIC FIBERS	1.00	1.00	3.00	3.00	0.00	3.00	11.00
2831	BIOLOGICAL PRODUCTS	5.00	1.00	3.00	3.00	3.00	3.00	18.00
2833	MEDICINAL CHEMICALS	1.00	1.00	3.00	1.00	3.00	3.00	12.00
2834	PHARMACEUTICAL PREPARATIONS	5.00	1.00	3.00	3.00	3.00	3.00	18.00
2841	SOAP AND DETERGENTS	1.00	0.00	1.00	1.00	5.00	3.00	11.00
2842	SPECIALTY CLEANING PRODUCTS	5.00	0.00	1.00	3.00	5.00	3.00	17.00
2843	SURFACE ACTIVE AGENTS	1.00	0.00	1.00	3.00	5.00	3.00	13.00
2844	PERFUMES COSMETICS	3.00	0.00	1.00	3.00	3.00	3.00	13.00
2851	PAINTS VARNISHES ENAMELS	5.00	0.00	1.00	3.00	5.00	3.00	17.00
2861	GUM AND WOOD CHEMICALS	1.00	1.00	3.00	3.00	5.00	3.00	16.00
2871	FERTILIZERS	1.00	1.00	3.00	3.00	3.00	3.00	14.00
2872	FERTILIZER MIXING	3.00	1.00	3.00	3.00	5.00	3.00	18.00
2879	AGRICULTURAL PESTICIDES	3.00	1.00	3.00	3.00	5.00	3.00	18.00
2891	ADHESIVES AND GELATIN	1.00	1.00	3.00	3.00	5.00	3.00	16.00
2892	EXPLOSIVES	1.00	1.00	3.00	3.00	0.00	3.00	11.00
2893	PRINTING INK	3.00	1.00	3.00	3.00	5.00	3.00	18.00
2895	CARRON BLACK	3.00	1.00	5.00	3.00	3.00	3.00	18.00
2899	OTHER CHEMICALS	1.00	1.00	3.00	3.00	5.00	3.00	16.00
2911	PETROLEUM REFINING	1.00	0.00	5.00	1.00	1.00	0.00	8.00
2951	PAVING MIXTURES AND BLOCKS	1.00	0.00	1.00	3.00	5.00	0.00	10.00
2952	ASPHALT FELTS AND COATINGS	1.00	0.00	1.00	3.00	3.00	0.00	8.00
2992	LUBRICATING OILS + GREASES	5.00	0.00	1.00	3.00	5.00	0.00	14.00
2999	PETROLEUM COAL PRODUCTS NEC	1.00	0.00	1.00	3.00	5.00	0.00	10.00
3011	TIRES AND INNER TUBES	5.00	1.00	3.00	1.00	0.00	1.00	11.00
3021	RUBBER FOOTWEAR	5.00	0.00	1.00	3.00	0.00	1.00	10.00
3031	RECLAIMED RUBBER	1.00	0.00	1.00	1.00	3.00	1.00	7.00
3069	RUBBER PRODUCTS NEC	5.00	0.00	1.00	3.00	3.00	1.00	13.00
3079	MISC PLASTICS PRODUCTS	5.00	0.00	1.00	3.00	3.00	1.00	13.00
3111	LEATHER TANNING	5.00	0.00	1.00	3.00	3.00	1.00	13.00
3121	LEATHER BELTING AND PACKING	3.00	0.00	1.00	3.00	5.00	1.00	13.00
3131	FOOTWEAR CUTSTOCK	3.00	0.00	1.00	3.00	5.00	1.00	13.00
3141	SHOES MINUS RUBBER	3.00	3.00	1.00	3.00	1.00	1.00	9.00
3142	HOUSE SLIPPERS	3.00	0.00	1.00	5.00	3.00	1.00	13.00
3151	LEATHER GLOVES MITTENS	3.00	0.00	1.00	5.00	5.00	1.00	15.00
3161	LUGGAGE	3.00	0.00	1.00	3.00	3.00	1.00	11.00
3171	WOMENS HANDBAGS	3.00	0.00	1.00	5.00	5.00	1.00	15.00
3172	OTHER PERSONAL LEATHER GOODS	3.00	0.00	1.00	5.00	5.00	1.00	15.00

TABLE A-4(continued)

3199	LEATHER GOODS NEC	3.00	0.00	1.00	5.00	5.00	1.00	15.00
3211	FLAT GLASS	5.00	1.00	3.00	1.00	0.00	1.00	11.00
3221	GLASS CONTAINERS	5.00	0.00	1.00	3.00	0.00	1.00	10.00
3229	PRESSED AND BLOWN GLASS	5.00	0.00	1.00	3.00	1.00	1.00	11.00
3231	PRODUCTS OF PURCHASED GLASS	5.00	0.00	1.00	3.00	5.00	1.00	15.00
3241	HYDRAULIC CEMENT	1.00	1.00	3.00	1.00	1.00	1.00	8.00
3251	BRICK + STRUCTURAL CLAY TILE	3.00	1.00	3.00	3.00	3.00	1.00	14.00
3253	CERAMIC WALL AND FLOOR TILE	3.00	1.00	3.00	3.00	3.00	1.00	14.00
3255	CLAY REFRACTORIES	5.00	1.00	3.00	3.00	3.00	1.00	16.00
3259	STRUCTURAL CLAY PRODUCTS NEC	3.00	1.00	3.00	3.00	3.00	1.00	14.00
3261	VITREOUS PLUMBING FIXTURES	5.00	1.00	3.00	3.00	1.00	1.00	14.00
3262	VITREOUS TABLE ARTICLES	3.00	1.00	3.00	3.00	1.00	1.00	12.00
3263	EARTHENWARE TABLE ARTICLES	3.00	1.00	3.00	3.00	0.00	1.00	11.00
3264	PORCELAIN ELECTRIC SUPPLIES	3.00	1.00	3.00	3.00	1.00	1.00	12.00
3269	POTTERY PRODUCTS NEC	3.00	1.00	3.00	3.00	5.00	1.00	16.00
3271	CONCRETE BLOCK AND BRICK	3.00	1.00	3.00	3.00	5.00	1.00	16.00
3272	OTHER CONCRETE PRODUCTS	3.00	1.00	3.00	3.00	5.00	1.00	16.00
3273	READY-MIXED CONCRETE	1.00	1.00	3.00	3.00	5.00	1.00	14.00
3274	LIME	1.00	1.00	3.00	3.00	3.00	1.00	12.00
3275	GYPSUM PRODUCTS	5.00	1.00	3.00	3.00	3.00	1.00	16.00
3281	CUT STONE	1.00	1.00	3.00	3.00	5.00	1.00	14.00
3291	ABRASIVE PRODUCTS	5.00	1.00	3.00	3.00	3.00	1.00	16.00
3292	ASBESTOS PRODUCTS	5.00	1.00	3.00	3.00	1.00	1.00	14.00
3293	GASKETS PACKING	5.00	1.00	3.00	3.00	3.00	1.00	16.00
3295	MINERALS GROUND OR HEATED	1.00	1.00	3.00	3.00	5.00	1.00	14.00
3296	MINERAL WOOD	5.00	1.00	3.00	3.00	3.00	1.00	16.00
3297	NONCLAY REFRACTORIES	1.00	1.00	3.00	3.00	3.00	1.00	12.00
3299	NONMETALLIC PRODUCTS NEC	5.00	1.00	3.00	3.00	5.00	1.00	18.00
3312	BLAST FURNACES STEEL WORKS	1.00	1.00	5.00	1.00	0.00	5.00	13.00
3313	ELECTRO METALLURGICAL PRODUCT	1.00	1.00	5.00	3.00	0.00	5.00	15.00
3315	STEEL WIRE DRAWING AND NAILS	5.00	1.00	5.00	3.00	3.00	5.00	22.00
3316	COLD ROLLED STEEL SHEET+BARS	5.00	1.00	5.00	1.00	1.00	5.00	18.00
3317	STEEL PIPE AND TUBES	5.00	1.00	5.00	3.00	1.00	5.00	20.00
3321	GRAY IRON FOUNDRIES	5.00	1.00	3.00	3.00	3.00	5.00	20.00
3322	MALLEABLE IRON FOUNDRIES	5.00	1.00	3.00	3.00	0.00	5.00	17.00
3323	STEEL FOUNDRIES	5.00	1.00	3.00	3.00	1.00	5.00	18.00
3331	PRIMARY COPPER PRODUCTION	1.00	3.00	5.00	3.00	0.00	5.00	17.00
3332	PRIMARY LEAD PRODUCTION	1.00	3.00	5.00	3.00	3.00	5.00	20.00
3333	PRIMARY ZINC PRODUCTION	1.00	3.00	5.00	3.00	0.00	5.00	17.00
3334	PRIMARY ALUMINUM PRODUCTION	1.00	3.00	5.00	1.00	0.00	5.00	15.00
3339	PRIMARY NONFERROUS PROD NEC	1.00	3.00	5.00	3.00	3.00	5.00	20.00
3341	SECONDARY NONFERROUS METAL	5.00	3.00	5.00	3.00	5.00	5.00	26.00
3351	COPPER ROLLING + DRAWING	1.00	1.00	1.00	3.00	0.00	5.00	11.00
3352	ALUMINUM ROLLING + DRAWING	5.00	1.00	1.00	1.00	0.00	5.00	13.00
3356	ROLLING DRAWING NEC	5.00	1.00	1.00	3.00	1.00	5.00	16.00
3357	NONFERROUS WIRE DRAWING	5.00	1.00	1.00	3.00	1.00	5.00	16.00
3361	ALUMINUM CASTINGS	5.00	0.00	1.00	3.00	5.00	5.00	19.00
3362	BRASS BRONZE+COPPER CASTING	5.00	0.00	1.00	3.00	5.00	5.00	19.00
3369	NONFERROUS CASTINGS NEC	5.00	0.00	1.00	3.00	3.00	5.00	17.00
3391	IRON AND STEEL FORGINGS	5.00	1.00	3.00	1.00	1.00	5.00	16.00
3399	PRIMARY METAL PRODUCTS NEC	1.00	1.00	3.00	3.00	5.00	5.00	18.00
3411	METAL CANS	3.00	0.00	1.00	3.00	1.00	0.00	8.00
3421	CUTLERY	5.00	0.00	1.00	3.00	3.00	0.00	12.00
3423	HAND EDGE TOOLS MINUS SAWS	5.00	0.00	1.00	3.00	3.00	0.00	12.00
3425	HAND SAWS AND SAW BLADES	5.00	0.00	1.00	3.00	3.00	0.00	12.00
3429	HARDWARE NEC	5.00	0.00	1.00	3.00	3.00	0.00	12.00

TABLE A-4.(continued)

3431	IRON METAL SANITARY WARE	5.00	0.00	1.00	3.00	3.00	0.00	12.00
3432	BRASS PLUMBING FITTINGS	5.00	0.00	1.00	3.00	3.00	0.00	12.00
3433	NUCLEONIC HEATING EQUIP	5.00	0.00	1.00	3.00	3.00	0.00	12.00
3441	FABRICATED STRUCTURAL STEEL	5.00	0.00	1.00	3.00	3.00	0.00	12.00
3442	METAL DOORS DASH + FRAMES	5.00	0.00	1.00	3.00	5.00	0.00	14.00
3443	FABRICATED PLATE WORK	3.00	0.00	1.00	3.00	3.00	0.00	10.00
3444	SHEET METAL WORK	5.00	0.00	1.00	3.00	5.00	0.00	14.00
3446	ARCHITECTURAL METAL WORK	3.00	0.00	1.00	3.00	5.00	0.00	12.00
3449	MISCELLANEOUS METAL WORK	3.00	0.00	1.00	3.00	3.00	0.00	10.00
3451	SCREW MACHINE PRODUCTS	3.00	0.00	0.00	3.00	5.00	0.00	11.00
3452	BOLTS NUTS SCREWS + WASHERS	3.00	0.00	0.00	3.00	3.00	0.00	9.00
3461	METAL STAMPINGS	5.00	0.00	1.00	3.00	3.00	0.00	12.00
3471	ELECTROPLATING	1.00	0.00	1.00	3.00	5.00	0.00	10.00
3479	COATING ENGRAVING ETC	5.00	0.00	1.00	3.00	5.00	0.00	14.00
3481	MISC FABRICATED WIRE PRODUCT	5.00	0.00	1.00	3.00	5.00	0.00	14.00
3491	METAL SHIPPING BARRELS+KEGS	5.00	0.00	1.00	3.00	3.00	0.00	12.00
3492	SAFES AND VAULTS	3.00	0.00	1.00	3.00	3.00	0.00	10.00
3493	STEEL SPRINGS	5.00	0.00	1.00	3.00	3.00	0.00	12.00
3494	VALVES PIPE FITTINGS	5.00	0.00	1.00	3.00	3.00	0.00	12.00
3496	COLLAPSIBLE TUBES	3.00	0.00	1.00	3.00	1.00	0.00	8.00
3497	METAL FILL AND LEAF	5.00	0.00	1.00	3.00	3.00	0.00	12.00
3498	FABRICATED PIPES + FITTINGS	5.00	0.00	1.00	3.00	5.00	0.00	14.00
3499	FABRICATED METAL PRODUCT NEC	5.00	0.00	1.00	3.00	5.00	0.00	14.00
3511	STEAM ENGINES AND TURBINES	1.00	1.00	3.00	1.00	0.00	0.00	6.00
3519	INTERNAL COMBUSTION ENGINE NEC	5.00	1.00	3.00	1.00	0.00	0.00	10.00
3522	FARM MACHINERY AND EQUIPMENT	5.00	1.00	3.00	3.00	3.00	0.00	15.00
3531	CONSTRUCTION MACHINERY	5.00	1.00	3.00	3.00	1.00	0.00	13.00
3532	MINING MACHINERY + EQUIPMENT	3.00	1.00	3.00	3.00	3.00	0.00	13.00
3533	OIL FIELD MACHINERY + EQUIP.	5.00	1.00	3.00	3.00	3.00	0.00	15.00
3534	ELEVATORS	3.00	1.00	3.00	1.00	3.00	0.00	11.00
3535	CONVEYORS	3.00	1.00	3.00	3.00	3.00	0.00	13.00
3536	HUISTS CRANES + MONORAILS	5.00	1.00	3.00	1.00	3.00	0.00	13.00
3537	INDUSTRIAL TRUCKS + TRACTORS	3.00	1.00	3.00	3.00	3.00	0.00	13.00
3541	METAL CUTTING MACHINE TOOLS	3.00	0.00	1.00	1.00	3.00	0.00	8.00
3542	METAL FORMING MACHINE TOOLS	3.00	0.00	1.00	1.00	3.00	0.00	8.00
3544	SPECIAL DIES TOOLS DYE SETS	5.00	0.00	1.00	1.00	5.00	0.00	12.00
3545	MACHINE TOOL ACCESSORIES	3.00	0.00	1.00	3.00	3.00	0.00	10.00
3548	METALWORKING MACHINERY	5.00	0.00	1.00	3.00	3.00	0.00	12.00
3551	FOOD PRODUCTS MACHINERY	3.00	0.00	1.00	3.00	3.00	0.00	10.00
3552	TEXTILE MACHINERY	5.00	0.00	1.00	3.00	3.00	0.00	12.00
3553	WOODWORKING MACHINERY	5.00	0.00	1.00	3.00	3.00	0.00	12.00
3554	PAPER INDUSTRIES MACHINERY	3.00	0.00	1.00	1.00	3.00	0.00	8.00
3555	PRINTING TRADES MACHINERY	3.00	0.00	1.00	1.00	3.00	0.00	8.00
3559	SPECIAL INDUSTRY MACHINERY NEC	5.00	0.00	1.00	3.00	3.00	0.00	12.00
3561	PUMPS AND COMPRESSORS	3.00	0.00	1.00	3.00	3.00	0.00	10.00
3562	BALL AND ROLLER BEARINGS	5.00	0.00	1.00	3.00	0.00	0.00	9.00
3564	BLOWERS AND FANS	3.00	0.00	1.00	3.00	3.00	0.00	10.00
3565	INDUSTRIAL PATTERNS	3.00	0.00	1.00	1.00	5.00	0.00	10.00
3566	POWER TRANSMISSION EQUIPMENT	5.00	0.00	1.00	3.00	3.00	0.00	12.00
3567	INDUSTRIAL FURNACES + OVENS	3.00	0.00	1.00	3.00	3.00	0.00	10.00
3569	OTHER INDUSTRIAL MACHINERY	5.00	0.00	1.00	3.00	3.00	0.00	12.00
3572	TYPEWRITERS	3.00	0.00	1.00	3.00	0.00	0.00	7.00
3573	ELECTRONIC COMPUTING EQUIP.	5.00	0.00	1.00	3.00	0.00	0.00	9.00
3574	CALCULATING + ACCTG MACHINES	3.00	0.00	1.00	1.00	0.00	0.00	5.00
3576	SCALES AND BALANCES	3.00	0.00	1.00	3.00	3.00	0.00	10.00
3579	OTHER OFFICE MACHINES	3.00	0.00	1.00	3.00	3.00	0.00	10.00

TABLE A-4.(continued)

3581	AUTOMATIC VENDING MACHINES	3.00	0.00	1.00	3.00	3.00	0.00	10.00
3582	COMMERCIAL LAUNDRY EQUIPMENT	3.00	0.00	1.00	3.00	3.00	0.00	10.00
3585	REFRIGERATION EQUIPMENT	5.00	0.00	1.00	3.00	3.00	0.00	12.00
3586	MEASURING + DISPENSING PUMPS	3.00	0.00	1.00	3.00	3.00	0.00	10.00
3589	SERVICE INDUSTRY MACHINES NEC	3.00	0.00	1.00	3.00	5.00	0.00	12.00
3599	MISC MACHINERY MINUS ELECT	5.00	0.00	1.00	3.00	5.00	0.00	13.00
3611	ELECTRIC MEASURING EQUIPMENT	3.00	0.00	1.00	3.00	3.00	0.00	10.00
3612	POWER TRANSFORMERS	5.00	0.00	1.00	3.00	1.00	0.00	10.00
3613	SWITCHGEAR SWITCHBOARD EQPMT	5.00	0.00	1.00	3.00	3.00	0.00	12.00
3621	MOTORS AND GENERATORS	5.00	0.00	1.00	3.00	0.00	0.00	9.00
3622	INDUSTRIAL CONTROLS	5.00	0.00	1.00	3.00	3.00	0.00	12.00
3623	WELDING APPARATUS	3.00	0.00	1.00	1.00	3.00	0.00	8.00
3624	CARBON + GRAPHITE PRODUCTS	5.00	0.00	1.00	3.00	1.00	0.00	10.00
3629	ELECTRICAL IND APPARATUS NEC	5.00	0.00	1.00	3.00	3.00	0.00	12.00
3631	HOUSEHOLD COOKING EQUIPMENT	3.00	3.00	5.00	3.00	0.00	0.00	14.00
3632	HOUSEHOLD REFRIGERATORS	5.00	3.00	5.00	3.00	0.00	0.00	16.00
3633	HOUSEHOLD LAUNDRY EQUIPMENT	5.00	3.00	5.00	3.00	0.00	0.00	16.00
3634	ELECTRIC HOUSEWARES + FANS	5.00	3.00	5.00	3.00	1.00	0.00	17.00
3635	HOUSEHOLD VACUUM CLEANERS	3.00	3.00	5.00	3.00	0.00	0.00	14.00
3636	SEWING MACHINES	3.00	3.00	5.00	1.00	3.00	0.00	15.00
3639	HOUSEHOLD APPLIANCES NEC	5.00	3.00	5.00	3.00	1.00	0.00	17.00
3641	ELECTRIC LAMPS	3.00	0.00	1.00	3.00	0.00	0.00	7.00
3642	LIGHTING FIXTURES	5.00	0.00	1.00	3.00	3.00	0.00	12.00
3643	CURRENT-CARRYING WIRING EQUI	5.00	0.00	1.00	3.00	3.00	0.00	12.00
3644	NONCURRENT-CARRYING WIRING EQ	5.00	0.00	1.00	3.00	3.00	0.00	12.00
3651	RADIO TV RECEIVING SETS	3.00	0.00	1.00	3.00	0.00	0.00	7.00
3652	PHONOGRAPH RECORDS	5.00	0.00	1.00	3.00	5.00	0.00	14.00
3661	TELEPHONE + TELEGRAPH EQUIP	3.00	0.00	3.00	3.00	0.00	0.00	9.00
3662	RADIO TV TRANSMITTING EQUIP	3.00	0.00	3.00	3.00	0.00	0.00	9.00
3671	ELECTRON TUBES RECEIVING	3.00	0.00	1.00	3.00	0.00	0.00	7.00
3672	CATHODE RAY PICTURE TUBES	5.00	0.00	1.00	3.00	0.00	0.00	9.00
3673	ELECTRON TUBES TRANSMITTING	5.00	0.00	1.00	3.00	0.00	0.00	9.00
3674	SEMICONDUCTORS	5.00	0.00	1.00	3.00	0.00	0.00	9.00
3679	ELECTRONIC COMPONENTS NEC	5.00	0.00	1.00	3.00	3.00	0.00	12.00
3691	STORAGE BATTERIES	5.00	0.00	1.00	3.00	3.00	0.00	12.00
3692	PRIMARY BATTERIES-WET AND DRY	3.00	0.00	1.00	3.00	1.00	0.00	8.00
3694	ELECTRICAL EQ FOR ENGINES	5.00	0.00	1.00	3.00	1.00	0.00	10.00
3699	ELECTRICAL EQUIPMENT NEC	3.00	0.00	1.00	3.00	5.00	0.00	12.00
3711	MOTOR VEHICLES	5.00	3.00	5.00	1.00	0.00	1.00	15.00
3712	PASSENGER CAR BODIES	3.00	3.00	5.00	5.00	0.00	1.00	17.00
3713	TRUCK AND BUS BODIES	3.00	1.00	3.00	3.00	5.00	1.00	16.00
3714	MOTOR VEHICLE PARTS	5.00	3.00	5.00	1.00	1.00	1.00	16.00
3715	TRUCK TRAILERS	5.00	1.00	3.00	3.00	3.00	1.00	16.00
3721	AIRCRAFT	3.00	0.00	3.00	1.00	0.00	1.00	8.00
3722	AIRCRAFT ENGINES + PARTS	5.00	0.00	3.00	1.00	0.00	1.00	10.00
3723	AIRCRAFT PROPELLERS + PARTS	3.00	0.00	3.00	5.00	0.00	1.00	12.00
3729	AIRCRAFT PARTS + EQ NEC	5.00	0.00	3.00	1.00	1.00	1.00	11.00
3731	SHIP BUILDING AND REPAIRING	5.00	0.00	1.00	1.00	0.00	1.00	8.00
3732	BOAT BUILDING AND REPAIRING	3.00	0.00	1.00	3.00	5.00	1.00	13.00
3741	LOCOMOTIVES AND PARTS	3.00	1.00	3.00	1.00	0.00	1.00	9.00
3742	RAILROAD AND STREETCARS	3.00	1.00	3.00	1.00	0.00	1.00	9.00
3751	MOTORCYCLES + BICYCLES + PARTS	3.00	1.00	3.00	3.00	3.00	1.00	14.00
3791	TRAILER COACHES	3.00	1.00	3.00	3.00	3.00	1.00	14.00
3799	TRANSPORTATION EQUIPMENT NEC	3.00	1.00	3.00	3.00	5.00	1.00	16.00
3811	LABORATORY RESEARCH EQUIPMEN	3.00	0.00	1.00	3.00	3.00	1.00	11.00
3821	MECH MEASURING DEVICES	5.00	0.00	1.00	3.00	3.00	1.00	13.00

TABLE A-4.(continued)

3822	AUTOMAT TEMPERATURE CONTROLS	3.00	0.00	1.00	3.00	0.00	1.00	8.00
3831	OPTICAL INSTRUMENTS + LENSES	3.00	0.00	1.00	3.00	3.00	1.00	11.00
3841	SURGICAL + MEDICAL INSTRUMEN	3.00	0.00	1.00	3.00	3.00	1.00	11.00
3842	SURGICAL APPLIANCES + SUPPLY	5.00	0.00	1.00	3.00	5.00	1.00	15.00
3843	DENTAL EQUIP AND SUPPLIES	3.00	0.00	1.00	3.00	5.00	1.00	13.00
3851	OPHTHALMIC GOODS	5.00	0.00	1.00	3.00	3.00	1.00	13.00
3861	PHOTOGRAPHIC EQUIP + SUPPLY	5.00	0.00	1.00	1.00	1.00	1.00	9.00
3871	WATCHES CLOCKS AND PARTS	5.00	0.00	1.00	3.00	1.00	1.00	11.00
3872	WATCHCASES	3.00	0.00	1.00	3.00	3.00	1.00	11.00
3911	JEWELRY PRECIOUS METAL	3.00	1.00	3.00	3.00	5.00	1.00	16.00
3912	JEWELERS FINDINGS + MATERIAL	3.00	1.00	3.00	3.00	5.00	1.00	16.00
3913	LAPIDARY WORK	3.00	1.00	3.00	3.00	5.00	1.00	16.00
3914	SILVERWARE + PLATED WARE	5.00	1.00	3.00	3.00	3.00	1.00	16.00
3931	MUSICAL INSTRUMENTS	3.00	0.00	1.00	3.00	3.00	1.00	11.00
3941	GAMES + TOYS MINUS DOLLS	5.00	1.00	3.00	3.00	3.00	1.00	16.00
3942	DOLLS	3.00	1.00	3.00	5.00	5.00	1.00	18.00
3943	CHILDRENS VEHICLES	3.00	1.00	3.00	3.00	3.00	1.00	14.00
3949	SPORTING GOODS NEC	3.00	1.00	3.00	3.00	5.00	1.00	16.00
3951	PENS POINTS + MECH PENCILS	1.00	0.00	1.00	3.00	3.00	1.00	11.00
3952	PENCILS CRAYONS ARTIST MATLS	3.00	0.00	1.00	3.00	3.00	1.00	11.00
3953	MARKING DEVICES	3.00	0.00	1.00	3.00	5.00	1.00	13.00
3955	CARBON PAPER + INKED RIBBON	3.00	0.00	1.00	3.00	3.00	1.00	11.00
3961	COSTUME JEWELRY + NOVELTIES	5.00	1.00	3.00	3.00	5.00	1.00	18.00
3962	FEATHERS ARTIFICIAL FLOWERS	3.00	1.00	3.00	5.00	5.00	1.00	18.00
3963	BUTTONS	3.00	1.00	3.00	3.00	5.00	1.00	16.00
3964	NEEDLES PINS HOOKS + EYES	5.00	1.00	3.00	3.00	3.00	1.00	16.00
3991	BROOMS AND BRUSHES	3.00	0.00	1.00	3.00	5.00	1.00	13.00
3993	SIGNS + ADVERTISING DISPLAYS	3.00	0.00	1.00	3.00	5.00	1.00	13.00
3994	MORTICIANS GOODS	3.00	0.00	1.00	3.00	5.00	1.00	13.00
3996	LINOLEUM + FLOOR COVERING NEC	3.00	0.00	1.00	3.00	0.00	1.00	8.00
3999	MANUFACTURING INDUSTRIES NEC	5.00	0.00	1.00	3.00	5.00	1.00	15.00

APPENDIX B

INDUSTRY AIR AND WATER POLLUTION
SCORES: TEN PARAMETERS

TABLE B-1. AIR AND WATER POLLUTION PARAMETERS

Industry	BOD	Dissolved Solids	Nitrogen	Phosphorus	Suspended Solids	Hydrocarbons	Nitrogen Oxides	Particulates	Sulphur Oxides	Oil and Grease	Score
Meat packing	1	0	0	0	1	1	0	1	0	4	8
Sausage and prepared meats	1	0	0	0	1	1	0	1	0	2	6
Poultry processing	1	0	1	2	1	0	0	0	0	1	6
Creamery butter	1	0	0	0	1	0	0	0	0	0	2
Cheese, natural and processed	1	3	4	3	1	0	0	0	0	0	12
Condensed and evaporated milk	1	0	0	0	1	0	0	0	0	0	2
Ice cream	1	0	0	0	1	0	0	0	0	0	2
Fluid milk	1	2	1	1	1	0	0	0	0	0	6
Canned and preserved fruits, vegetables, and seafood	1	0	0	0	1	0	0	0	0	0	2
Grain and flour products	1	0	0	0	1	0	2	0	0	0	4
Prepared feed for animals	0	0	0	0	0	0	0	0	0	0	0
Rice milling	4	0	3	4	4	0	0	0	0	0	15
Wet corn milling	1	0	0	0	1	0	0	1	0	0	3
Bakery products	0	0	0	0	0	0	0	0	0	0	0
Beet sugar	1	1	0	0	1	0	0	0	0	0	3
Confectionery and related products	0	0	0	0	0	0	0	0	0	0	0
Malt liquor	1	0	1	1	1	0	0	1	0	0	5
Malt	2	0	0	0	2	0	0	0	0	0	4
Distilled and blended liquors	1	0	0	0	4	2	0	1	0	0	8
Bottled soft drinks	2	0	0	0	1	0	0	0	0	0	3
Animal and marine fats and oils (rendering)	1	0	0	0	0	0	0	0	0	0	1
Roasted coffee	0	0	0	0	1	1	0	0	0	0	2
Broad woven man-made fabrics	1	0	0	0	1	0	0	0	0	0	2
Broad woven wool fabrics	1	0	0	0	1	0	0	0	0	0	2
Cotton finishers	0	1	0	0	0	0	0	0	0	0	1
Man-made finishers	1	0	0	0	1	0	0	0	0	0	2
Carpets and rugs	1	0	0	0	1	0	0	0	0	0	2
Wool scouring and worsted	1	0	0	0	1	0	0	0	0	3	5
Millinery	1	0	0	0	1	0	0	0	0	0	2
Logging camps and logging contractors	2	0	0	0	2	0	0	1	1	0	6
Sawmills and planing mills	2	0	0	0	2	0	0	1	1	0	6
Hardwood dimension and flooring mills	1	0	0	0	1	0	0	1	0	0	3
Millwork	2	0	0	0	1	0	0	1	1	0	5
Veneer and plywood	1	0	0	0	2	0	0	1	1	0	5
Prefabricated wooden buildings and structural members	2	0	0	0	0	0	0	1	1	0	4
Wooden boxes	2	0	0	0	0	0	0	1	1	0	4
Wirebound boxes and crates	2	0	0	0	0	0	0	1	1	0	4
Veneer plywood containers	2	0	0	0	1	0	0	1	1	0	5
Cooperage	2	0	0	0	0	0	0	0	1	0	3
Wood preserving	2	0	0	0	1	0	0	1	1	0	5
Wood products, nec.	2	0	0	0	1	0	0	1	1	0	5
Wood household furniture	0	0	0	0	0	0	0	0	0	0	0
Upholstered wood household furniture	0	0	0	0	0	0	0	0	0	0	0
Metal household furniture	0	0	0	0	0	0	0	0	0	0	0
Mattresses and bedsprings	0	0	0	0	0	0	0	0	0	0	0

TABLE B-1. (Continued)

Industry	BOD	Dissolved Solids	Nitrogen	Phosphorus	Suspended Solids	Hydrocarbons	Nitrogen Oxides	Particulates	Sulphur Oxides	Oil and Grease	Score
Other household furniture	0	0	0	0	0	0	0	0	0	0	0
Wood office furniture	0	0	0	0	0	0	0	0	0	0	0
Metal office furniture	0	0	0	0	0	0	0	0	0	0	0
Public building furniture	0	0	0	0	0	0	0	0	0	0	0
Wood partitions and shelving	0	0	0	0	0	0	0	0	0	0	0
Metal partitions and shelving	0	0	0	0	0	0	0	0	0	0	0
Venetian blinds and shades	0	0	0	0	0	0	0	0	0	0	0
Other furniture and fixtures	0	0	0	0	0	0	0	0	0	0	0
Pulp mills	2	1	0	0	3	0	0	1	1	0	8
Paper mills	1	0	0	0	1	0	0	1	0	0	3
Paperboard mills	1	0	0	0	1	0	0	1	0	0	3
Paper coating and glazing	1	0	0	0	2	0	0	0	0	0	3
Paper products	1	0	0	0	2	0	0	0	0	0	3
Folding paperboard boxes	0	0	0	0	0	0	0	0	1	0	1
Setup paperboard boxes	0	0	0	0	0	0	0	0	1	0	1
Corrugated fiber boxes	0	0	0	0	0	0	0	0	1	0	1
Sanitary food containers	0	0	0	0	0	0	0	0	1	0	1
Fiber cans, tubes, drums	0	0	0	0	0	0	0	0	1	0	1
Building paper and building paperboard	1	0	0	0	3	0	0	0	0	0	4
Newspaper publishing and printing	0	0	0	0	0	0	0	0	0	0	0
Periodicals	0	0	0	0	0	0	0	0	0	0	0
Books	0	0	0	0	0	0	0	0	0	0	0
Commercial printing	0	0	0	0	0	0	0	0	0	0	0
Lithographic printing	0	0	0	0	0	0	0	0	0	0	0
Alkalies and chlorine	1	4	0	0	2	0	0	1	0	0	8
Dyes cyclic crudes	1	2	0	0	1	0	0	0	0	2	6
Inorganic pigments	1	2	0	0	2	0	0	0	0	0	5
Organic chemicals, nec.	1	0	0	0	1	0	2	0	0	2	6
Inorganic chemicals, nec.	1	3	0	0	2	3	3	4	2	0	18
Plastic Materials and synthetic resins	1	0	0	0	1	0	0	0	1	0	3
Synthetic rubber	1	0	0	0	1	3	0	0	0	0	5
Cellulosic fibers	1	0	0	0	1	1	0	0	0	0	3
Synthetic fibers	1	0	0	0	1	1	0	0	0	0	3
Biological products	0	0	0	0	0	0	0	0	1	0	1
Medicinal chemicals	0	0	0	0	0	0	0	0	1	0	1
Pharmaceutical preparations	0	0	0	0	0	0	0	0	1	0	1
Soap and detergents	1	0	0	0	0	0	0	1	0	0	2
Paints, varnishes, enamels	0	0	0	0	0	1	0	1	0	0	2
Gum and wood chemicals	1	0	0	0	1	2	0	2	0	0	6
Fertilizers	0	0	0	0	0	0	0	2	1	0	3
Fertilizer mixing	0	0	0	0	0	0	0	2	1	0	3
Agricultural pesticides	0	4	0	3	0	0	0	1	1	0	9
Explosives	1	2	2	0	1	0	0	1	1	4	12
Printing ink	0	0	0	0	0	0	0	1	0	0	1
Carbon black	0	0	0	0	0	4	0	2	0	0	6
Miscellaneous chemicals	0	0	0	0	0	0	0	1	0	0	1
Petroleum refining	1	2	2	0	1	2	2	1	1	3	15
Paving mixtures and blocks	1	0	0	0	0	3	0	2	0	0	6

TABLE B-1. (Continued)

Industry	BOD	Dissolving Solids	Nitrogen	Phosphorus	Suspended Solids	Hydro-carbons	Nitrogen Oxides	Particulates	Sulphur Oxides	Oil and Grease	Score
Asphalt felts	1	0	0	0	0	2	0	1	1	0	5
Tires and inner tubes	0	0	0	0	0	0	0	0	0	0	0
Rubber footwear	0	0	0	0	0	0	0	0	0	0	0
Reclaimed rubber	0	0	0	0	0	0	0	0	0	0	0
Rubber products, nec.	0	0	0	0	0	0	0	0	0	0	0
Leather tanning	1	2	0	0	1	0	0	0	0	2	6
Flat glass	0	0	0	2	1	0	0	0	0	1	4
Pressed and blown glass and glassware	0	0	0	0	1	0	0	1	0	0	2
Glass products (purchased glass)	0	0	0	2	1	0	0	1	0	0	4
Cement - Hydraulic	0	0	0	0	3	0	0	2	0	0	5
Brick and structural tile	0	0	0	0	0	0	2	2	0	0	4
Clay refractories	0	0	0	0	0	0	2	1	0	0	3
Ready mixed concrete, lime, and gypsum products	0	0	0	0	1	0	0	3	0	0	4
Concrete block, brick, and other products	0	0	0	0	1	0	0	4	0	0	5
Cut stone and stone products	1	0	0	0	0	0	0	0	0	0	1
Asbestos products	1	0	0	0	1	0	0	0	0	0	2
Minerals and earths ground	0	0	0	0	0	0	0	4	0	0	4
Mineral wool	0	0	0	0	0	0	0	1	1	0	2
Nonclay prefactories	0	0	0	0	0	0	0	1	0	0	1
Blast furnaces and steel mills	1	0	0	2	2	0	0	2	0	4	11
Electrometallurgical products	0	0	0	0	0	0	0	3	0	0	3
Gray iron foundries	1	0	0	0	0	0	0	1	0	0	2
Steel foundries	0	0	0	0	0	0	1	1	0	0	2
Primary copper	0	0	0	0	0	0	0	1	4	0	5
Primary lead	0	0	0	0	0	0	0	1	4	0	5
Primary zinc	0	0	0	0	0	0	4	1	0	0	5
Primary aluminum	0	0	0	0	2	0	0	1	0	0	3
Secondary nonferrous metals	0	0	0	0	0	0	0	1	2	0	3
Rolling, drawing, extruding aluminum	0	0	0	2	1	0	0	0	0	2	5
Ingot casting aluminum	0	0	0	0	1	0	0	1	0	1	3
Brass, bronze, copper, casting	0	0	0	0	0	0	0	1	0	0	1
Metal cans	0	0	0	0	0	0	0	0	0	0	0
Heating and plumbing fixtures	0	0	0	0	0	0	0	0	1	0	1
Fabricated structural steel	0	0	0	0	0	0	0	0	1	0	1
Metal stamping	1	0	0	1	1	0	0	0	0	1	4
Plating, electroplating, polishing, etc.	0	0	0	0	0	0	0	0	0	0	0
Other metal fabricated products	0	0	0	0	0	0	0	0	1	0	1
Machinery except electrical	0	0	0	0	1	0	0	1	1	0	3
Electrical machinery, equipment and supplies	0	0	0	0	0	0	0	1	0	0	1
Motor vehicles and car bodies	1	0	0	1	1	0	0	0	1	1	5
Truck and bus bodies	1	0	0	1	1	0	0	0	1	1	5
Motor vehicle parts	1	0	0	1	1	0	0	0	1	1	5

APPENDIX C

INDUSTRY SOLID WASTE POLLUTION
SCORES: FOUR PARAMETERS

TABLE C-1. SOLID WASTE POLLUTION PARAMETERS

Industry	Nonbulky				Score
	Wood	Paper	Ferrous	Other	
Meat packing	1	1	1	0	3
Sausage and prepared meats	1	1	1	1	4
Poultry processing	1	1	0	1	3
Creamery butter	0	1	0	0	1
Cheese, natural and processed	1	1	0	1	3
Condensed and evaporated milk	0	1	1	1	3
Ice cream	1	0	1	1	3
Fluid milk	1	1	1	1	4
Canned and preserved fruits, vegetables and sea foods	1	1	1	1	4
Grain and flour products	0	0	1	1	2
Prepared feed for animals	2	1	1	1	5
Rice milling	0	0	0	0	0
Wet corn milling	0	0	0	0	0
Bakery products	1	1	1	0	3
Beet sugar	0	0	0	0	0
Confectionery and related products	1	1	1	2	5
Malt Liquor	1	1	1	0	3
Malt	0	0	0	0	0
Distilled and blended liquors	0	1	0	1	2
Bottled soft drinks	1	1	1	1	4
Animal and marine fats and oils (rendering)	1	2	1	1	5
Roasted coffee	0	1	1	0	2
Broad woven man-made fabric	0	1	1	1	3
Broad wove. wool fabrics	0	1	1	1	3
Cotton finishers	0	1	1	1	3
Man-made finishers	0	0	0	1	1
Carpets and rugs	1	1	0	0	2
Wool scouring and worsted	0	1	1	1	3
Millinery	0	2	0	1	3
Logging camps and logging contractors	0	0	0	0	0
Sawmills and planing mills	4	2	1	1	8
Hardwood dimension and flooring mills	4	0	0	0	4
Millwork	2	1	1	1	5
Veneer and plywood	2	0	0	1	3
Prefabricated wooden buildings and structural members	1	2	1	1	5
Wooden boxes	3	2	1	1	7
Wirebound boxes and crates	1	1	0	0	2
Veneer plywood containers	1	0	0	0	1
Cooperage	2	0	0	0	2
Wood preserving	3	0	0	0	3
Wood products, nec. *	4	1	1	1	7
Wood household furniture	1	1	1	4	7
Upholstered wood household furniture	2	1	1	1	5

TABLE C-1. (CONTINUED)

Industry	Nonbulky				Score
	Wood	Paper	Ferrous	Other	
Metal household furniture	1	1	1	1	4
Mattresses and bedsprings	1	2	1	1	5
Other household furniture	1	1	0	0	2
Wood office furniture	2	1	1	1	5
Metal office furniture	1	1	1	1	4
Public building furniture	2	1	1	1	5
Wood partition and shelving	1	1	1	1	4
Metal partitions and shelving	1	1	2	1	5
Venetian blinds and shades	1	1	1	1	4
Other furniture and fixtures	1	1	1	1	4
Pulp mills	0	0	0	0	0
Paper mills	3	2	1	0	6
Paperboard mills	2	0	0	1	3
Paper coating and glazing	1	1	1	1	4
Paper products	1	2	1	1	5
Folding paperboard boxes	1	2	1	1	5
Setup paperboard boxes	1	2	1	1	5
Corrugated fiber boxes	1	4	1	1	7
Sanitary food containers	0	0	0	2	2
Fiber cans, tubes, drums	1	2	1	1	5
Building paper and building paper board	1	2	0	1	4
Newspaper publishing and printing	1	1	1	1	4
Periodicals	0	2	1	0	3
Books	1	2	1	1	5
Commercial printing	1	1	1	1	4
Lithographic printing	1	2	1	1	5
Alkalies and chlorine	0	0	0	0	0
Dyes cyclic crudes	0	1	0	1	2
Inorganic pigments	0	1	1	1	3
Organic chemicals, nec.*	0	1	1	1	3
Inorganic chemicals, nec.*	1	1	1	1	4
Plastic materials and synthetic resins	4	1	1	2	8
Synthetic rubber	0	0	0	1	1
Cellulosic fibers	0	0	0	1	1
Synthetic fibers	0	0	0	0	0
Biological products	0	1	0	1	2
Medicinal chemicals	0	4	0	2	6
Pharmaceutical preparations	1	1	1	1	4
Soap and detergents	0	1	1	1	3
Paints, varnishes, enamels	0	2	1	1	4
Gum and wood chemicals	0	0	0	0	0
Fertilizers	1	1	1	0	3
Fertilizer mixing	0	1	1	1	3
Agricultural pesticides	1	1	0	1	3
Explosives	0	1	0	1	2
Printing ink	0	2	1	4	7

TABLE C-1. (CONTINUED)

Industry	Nonbulky				Score
	Wood	Paper	Ferrous	Other	
Carbon black	0	0	0	0	0
Miscellaneous chemicals	1	2	1	2	6
Petroleum refining	0	1	1	1	3
Paving mixtures and blocks	0	1	0	0	1
Asphalt felts	0	1	1	1	3
Tires and inner tubes	1	1	1	1	4
Rubber footwear	0	1	0	1	2
Reclaimed rubber	1	1	0	0	2
Rubber products, nec. *	1	1	1	1	4
Leather tanning	0	1	0	1	2
Flat glass	1	1	0	0	2
Pressed and blown glass and glassware	1	1	0	1	3
Glass products (purchased glass)	1	1	1	1	4
Cement - Hydraulic	1	1	1	1	4
Brick plus structural tile	0	1	1	2	4
Clay refractories	1	1	1	1	4
Ready mixed concrete, lime, and gypsum products	0	1	0	1	2
Concrete block, brick, and other products	1	1	1	0	3
Cut stone and stone products	1	1	0	1	3
Asbestos products	0	1	0	1	2
Minerals and earths ground	0	1	4	1	6
Mineral wool	0	0	0	2	2
Non clay prefactories	0	1	1	1	3
Blast furnaces and steel mills	1	1	2	2	6
Electrometallurgical products	0	0	2	0	2
Gray iron foundries	1	1	1	1	4
Steel foundries	1	1	2	1	5
Primary copper	0	0	0	0	0
Primary lead	0	0	0	0	0
Primary zinc	0	0	0	0	0
Primary aluminum	0	0	0	0	0
Secondary nonferrous metals	3	1	3	1	8
Rolling drawing extruding aluminum	0	1	0	1	2
Ingot casting aluminum	1	1	1	1	4
Brass, bronze, copper, casting	1	1	1	1	4
Metal cans	1	1	1	1	4
Heating and plumbing fixtures	0	1	1	1	3
Fabricated structural steel	0	0	1	0	1
Metal stamping	1	2	1	1	5
Plating, electroplating, polishing, etc.	1	1	1	1	4
Other metal fabricated products	1	1	2	1	5
Machinery except electrical	1	1	2	1	5
Electrical machinery, equipment and supplies	1	1	1	1	4

TABLE C-1. (CONTINUED)

Industry	Wood	Paper	Nonbulky		Score
			Ferrous	Other	
Motor vehicles and car bodies	1	1	1	1	4
Truck and bus bodies	1	1	1	1	4
Motor vehicle parts	1	1	1	1	4

* nec means not elsewhere classified.